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Investing in students: a quantitative study of the impact of an institution's characteristics on retention rates for public 2-year institutions

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Investing in students: A quantitative study of the impact of an institution's characteristics on retention rates for public 2-year institutions

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ABSTRACT

At the same time that higher education was trying to balance their internal budgets, they began to feel influences regarding accountability to external sources. Community colleges have been forced to try to "do more with less" by cutting costs, boosting their productivity, and improving the quality of their services. Through various studies, it has been found that both organizational behaviors and specific organizational attributes (the existence of equitable administrative policies, decision making practices, etc.) have an impact on student persistence. Yet, even with the existence of empirical evidence to support the relationship between particular organizational attributes and student persistence, it is unclear as to exactly which attributes may have the greatest impact.

This study was framed around the goals of trying to determine a relationship between institutional characteristics and retention rates at public 2-year institutions. The specific purpose of this study was to understand the relationship between the public 2-year educational institutions' institutional characteristics and first-year retention rates within the framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence. It was the intended goal of this study to obtain an understanding of how an institution's characteristics and revenue and expenditure structures/patterns impact student retention rates in an effort to assist organizations in their configuration of resources to improve these rates.

Since there has been significantly more research that addresses how student characteristics impact retention rates than how institutional characteristics impact these rates, a study of the relationship between institutional characteristics and retention rates of public 2-year educational institutions could have many implications for research. First,

understanding these relationships can help institutions evaluate their financial strategies to improve student outcomes. Second, the results of this study may serve as evidence to support institutional efforts in obtaining certain forms of revenue that could benefit student performance. The further importance of this study would be the positive impacts to the students and the community as a result of students achieving greater educational attainment. Finally, this study should contribute to the general knowledge and research in higher education and student outcomes.

CHAPTER 1. CONTEXT OF THE PROBLEM

Overview

Business and industry have had a long-standing history of implementing approaches like Total Quality Management (TQM) and Continuous Quality Improvement (CQI) in efforts to internally cut costs and improve quality. Since the "demand has increased sevenfold [for colleges and universities] since World War II and is expected to continue growing [and] operating costs have escalated and public-sector financial support has flattened," these institutions have been forced to look for similar business approaches to managing and controlling their costs (Stephens, 2000).

At the same time that higher education was trying to balance their internal budgets, they began to feel influences regarding accountability to external sources. "One of the most common state policy trends affecting higher education across the nation is the growing demand from governors and legislators for community colleges to be more responsive to state needs" (Center for Community College Policy, 2000, p. 43). This phenomenon has forced institutions of higher education to "do more with less" including cutting costs, boosting productivity, and improving the quality of services (Ruppert, 2002). By using outcomes to measure performance, it may be possible to achieve equal or greater results for less money (Ruppert, 2002). Hence, many states have redesigned their funding systems in an effort to move away from the traditional system in which states were held responsible for institutional needs towards a modern system that holds institutions accountable for state needs. Thus, different types of performance indicators have been developed as the individual standards or measurements as defined by the individual states using a methodology similar to

the business approach of TQM in an attempt to quantify the success towards the completion of institutional goals.

Statement of the Problem

Economists typically define productivity as the ratio of output to input in an organization or the ratio of the total benefits to the total costs:

$$\text{Productivity} = \frac{\text{Total Benefits}}{\text{Total Costs}}$$

Within a paradigm of declining resources and increasing accountability, it is difficult to study the productivity of institutions of higher education since the inputs into higher education typically are outside of the control of administrators and the outputs generally are more difficult to measure than those within a standard business entity (Birnbaum, 1988). That is, several of the benefits received through the process of education are qualitative in nature, and therefore difficult to measure on a standard scale.

Astin and Scherrei (1980) found that organizational behaviors have an impact on student persistence. Specific organizational attributes (the existence of equitable administrative policies, decisionmaking practices, etc.) also have been found to have an impact on student persistence (Braxton & Brier, 1989). Yet, even with empirical evidence to support the relationship between particular organizational attributes and student persistence, it is unclear exactly which attributes may have the greatest impact.

Taylor, Meyerson, and Massy (1993) surveyed over 700 colleges and universities across the nation (public and private, 2-year and 4-year) and, from those data, came up with over 90 indicators of "institutional health." They further identified 10 "critical success

factors" that, "despite vast differences among institutions...may form the core of many institutions 'to watch' list" (Taylor, Meyerson, & Massy, 1993, p. xv):

1. overall revenue structure,
2. overall expenditure structure,
3. excess (deficit) of current fund revenues over current fund expenditures,
4. percent of freshmen applicants accepted and percent of accepted freshmen who matriculated,
5. ratio of full-time equivalent students to full-time equivalent faculty,
6. institutional grant aid as a percent of tuition and fee income,
7. tenure status of full-time equivalent faculty,
8. percent of total full-time equivalent employees who are faculty,
9. maintenance backlog as a percent of total replacement value of plant, and
10. percent of living alumni who have given at any time during the past five years.

The examination of the relationship between any of these indicators of institutional health to institutional outputs could allow administrators more information on how to improve their institutions' goals like retention and graduation rates, which are measures frequently used to evaluate efficiency and productivity (Burke, 1998c). Although several of these indicators are not applicable to public 2-year institutions, the more in-depth examination of the first two measures of institutional health (the overall revenue structure and the overall expenditure structure) as well as the institutional characteristics that are applicable to public 2-year institutions could provide important information on how to align institutions' financial patterns with their output goals of student retention and graduation.

Purpose of the Study

The purpose of this study is to understand the relationship between the institutional characteristics of public 2-year educational institutions and their retention rates. The institutional characteristics are defined as the inputs into the organization including the general institutional characteristics and the overall revenue structure/patterns. This study determined the impact of these characteristics on both the expenditure structure/patterns and on the further outcome of student retention rates.

The output measure of an institution's retention rate is important because it is a measure of an institution's ability to retain the students who chose to attend that institution (Tinto, 1993). Additionally, with 2-year public institutions' missions of lifelong learning, retention rates could be considered a measurement of their fulfillment of that mission. Graduation rates, although important measures of student success, are not necessarily important measures of success at public 2-year institutions since many students may achieve their goals without actually graduating from the institution. Additionally, since the public 2-year institution is one that generally regards "accessibility as its greatest virtue … the community colleges have organized themselves around the theme of ease of entrance, exit, and reentry and … [helping students attain] their short-term goals" rather than strictly promoting degree attainment (Cohen & Brawer, 2003, p. 66).

Public 2-year institutions (i.e., community colleges), in particular, will be studied since, by definition, they were created as a response to and to be responsive to community needs. Additionally, since half of the students who begin college in the United States begin at a community college, increased retention rates could have a large impact on the educational population (Cohen & Brawer, 2003). Due to the largely varying methods for higher

education funding, this study focused on the isolated geographical regions of the Great Lakes states (Illinois, Indiana, Michigan, Ohio, and Wisconsin) and the Plains states (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota).

The institutional health variables used were the overall revenue structure/patterns, the overall expenditure structure/patterns, the ratio of full-time equivalent students to full-time faculty, the percentage of total full-time employees who are faculty, and the institutional grant aid as a percent of tuition and fee income. The excess (deficit) of current fund revenues over current fund expenditures was not used since, during a portion of the time period being studied, Title IV program funding required institutions to meet "financial responsibility standards" for program funding which included an operating fund requirement (National Association of Student Financial Aid Administrators, 2005). The percentage of freshmen applicants accepted and percentage of accepted freshmen who matriculated were not applicable to public 2-year institutions due to the open admission policy of many of those institutions. Since many public 2-year institutions do not categorize their faculty by tenure status, the tenure status of full-time equivalent faculty was not used. Additionally, the maintenance backlog as a percentage of total replacement value of plant and the percentage of living alumni who have given at any time during the past five years were unavailable data and, thus, were not included in the institutional characteristics.

The revenues will be categorized into the three sources of tuition and fees, non-federal government appropriations, and all other sources or revenue. The expenditures will be grouped into the five categories of instruction expenditures, academic support, student services, institutional support, and all other expenditures. Both the revenue and expenditures

will use variables that test their overall structures (i.e., percentage of overall amounts) and their patterns (i.e., amount per full-time equivalent student or FTE).

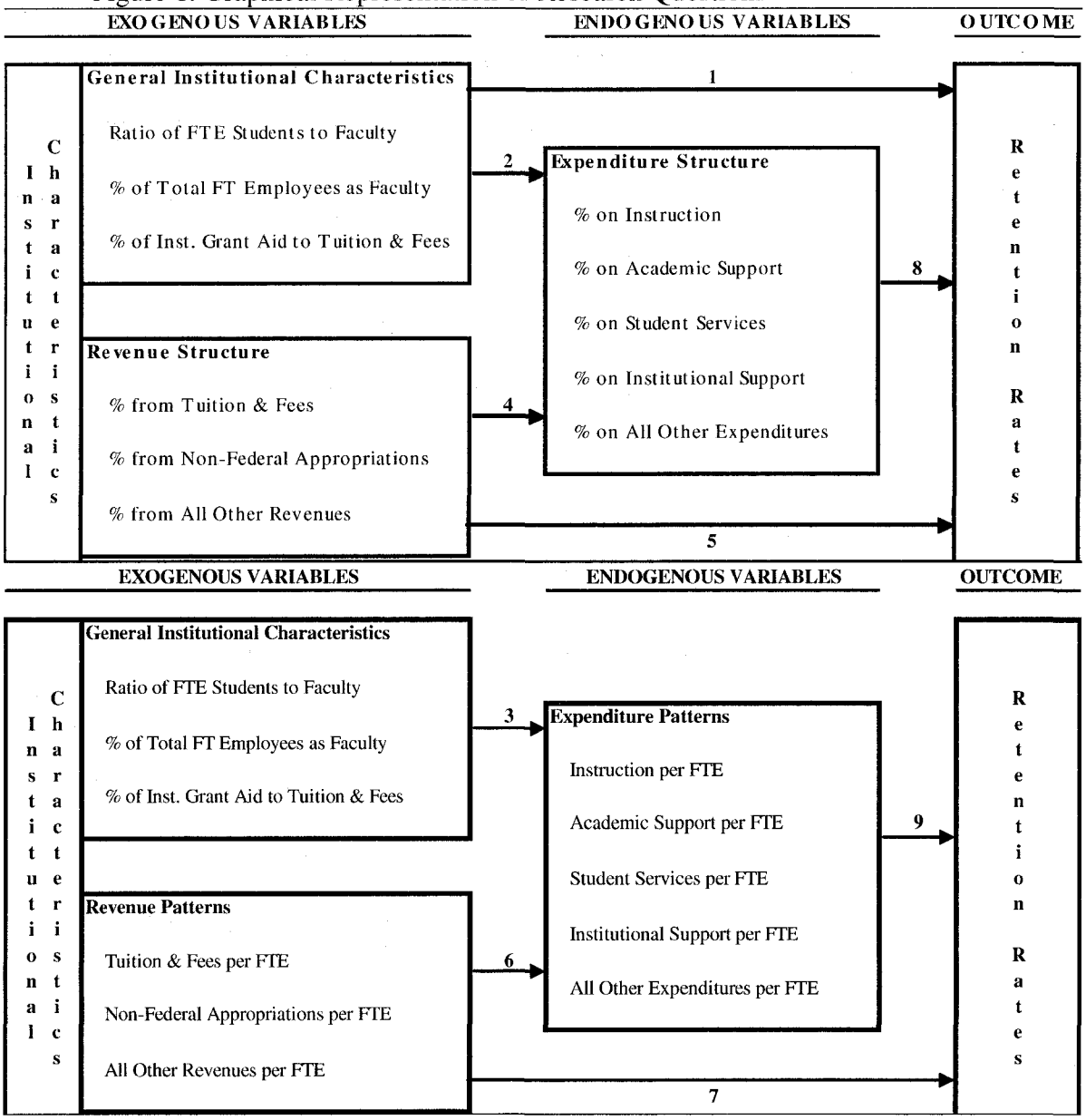
Theoretical and Conceptual Frameworks

This study was organized around both the theoretical framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence. The "resource dependence theory is a theory of organization(s) that seeks to explain organizational and inter-organizational behavior in terms of those critical resources which an organization must have in order to survive and function" (Johnson, 1995, p. 1). The second concept that this research was organized around was the organizational nature of student persistence, which is an elaboration of Tinto's interactionalist theory of student departure, and contends that the organizational structure of an institution has an impact on student persistence.

Research Questions

This study was framed around the goals of trying to determine a relationship between institutional characteristics and retention rates at public 2-year institutions. The 9 main research questions studied are visualized in Figure 1:

Figure 1. Graphical Representation of Research Questions



Research Questions:

General Institutional Characteristics

1. In the 2003-2004 fiscal year, were the general institutional characteristics of public 2-year institutions alone able to predict first-year retention rates?

2. Between 1994-1995 and 2003-2004, were the general institutional characteristics of public 2-year institutions able to predict the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses?
3. Between 1994-1995 and 2003-2004, were the general institutional characteristics of public 2-year institutions able to predict the amount spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?

Revenue Structure/Patterns

4. Between 1994-1995 and 2003-2004, were the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions able to predict the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?
5. In the 2003-2004 fiscal year, were the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions alone able to predict first-year retention rates?
6. Between 1994-1995 and 2003-2004, were the dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions able to predict the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?

7. In the 2003-2004 fiscal year, were the dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions alone able to predict first-year retention rates?

Expenditure Structure/Patterns

8. In the 2003-2004 fiscal year, were the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses at public 2-year institutions alone able to predict first-year retention rates?
9. In the 2003-2004 fiscal year, were the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses at public 2-year institutions alone able to predict first-year retention rates?

Additionally, due to the potential financial differences between Arts and Sciences-oriented institutions and Applied Sciences-oriented institutions, the institutions will be analyzed both as one group and separately by educational orientation.

Definition of Terms

To facilitate a better understanding of this study, a definition of significant terms has been provided:

Institutional Type

Public institution-An educational institution whose programs and activities are operated by publicly elected or appointed school officials and which is supported primarily by public funds. (NCES, 2005)

2-year institution-A postsecondary institution that offers programs of at least 2 but less than 4 years duration. Includes occupational and vocational schools with programs of at least 1800

hours and academic institutions with programs of less than 4 years. Does not include bachelor's degree-granting institutions where the baccalaureate program can be completed in 3 years. (NCES, 2005)

Dependent Variable

Retention rate-A measure of the rate at which students persist in their educational program at an institution, expressed as a percentage. For other than 4-year institutions, this is the percentage of first-time degree/certificate-seeking students from the previous fall who either re-enrolled or successfully completed their program by the current fall. (NCES, 2005)

Independent Variables

Institutional Characteristics-The institutional characteristics will be broken down into the three categories of ratio of FTE students to full-time faculty, the percentage of total full-time employees who are faculty, and the institutional grant aid as a percentage of tuition and fee income.

> *Full-Time Equivalency (FTE)-T*he number of full-time-equivalent (FTE) students used in the NPEC Data Feedback report is based on the institution's calendar system (as reported under Institutional Characteristics), the instructional activity (total credit hours and total contact hours) for a 12-month period (as reported under Enrollment) and the 12-month unduplicated headcount of first-professional students (as reported under Enrollment). For institutions with a semester, trimester, or 4-1-4 plan, the number of FTE undergraduate and graduate students is the sum of: (1) undergraduate credit hours divided by 30; (2) graduate credit hours divided by 24; and (3) contact hours divided by 900. For institutions with a quarter plan, undergraduate and graduate FTE is the sum of: (1) undergraduate credit hours divided by 45; (2) graduate credit

hours divided by 36; and (3) contact hours divided by 900. For institutions with continuous enrollment over a 12-month period, undergraduate credit hours were divided by 30 and contact hours were divided by 900. The FTE of first-professional students is determined by estimating the number of full-time and part-time first-professional 12-month unduplicated headcounts, by calculating the ratio of full-time to part-time first-professional students based on fall enrollment and applying this ratio to the 12-month unduplicated headcount of first professional students. The estimated full-time 12-month unduplicated headcount is added to 1/3 of the estimated part-time 12-month unduplicated headcount. (NCES, 2005)

Full-time instructional faculty-Those members of the instruction/research staff who are employed full time and whose major regular assignment is instruction, including those with released time for research. Also, includes full-time faculty for whom it is not possible to differentiate between teaching, research, and public service because each of these functions is an integral component of his/her regular assignment. (NCES, 2005)

Full-time staff (employees)-As defined by the institution. The type of appointment at the snapshot date determines whether an employee is full time or part time. The employee's term of contract is not considered in making the determination of full or part time. (NCES, 2005)

Institutional grant aid-Institutional grants from restricted sources are expenditures for scholarships and fellowships received from private sources (e.g., businesses, foundations, individuals, foreign governments) that used restricted-expendable net assets of the institution. Institutional grants from unrestricted sources are expenditures

for scholarships and fellowships from unrestricted net assets of the institution. The institutional matching portion of federal, state, or local grants is reported here. Athletic scholarships are also included here. (NCES, 2005)

Overall revenue structure/patterns-The revenues were categorized into three sources of (1) tuition and fees, (2) non-federal government appropriations, and (3) other sources or revenue.

Tuition and fees-Revenues from all tuition and fees assessed against students (net of refunds and discounts and allowances) for educational purposes. If tuition or fees are remitted to the state as an offset to the state appropriation, the total of such tuition or fees are deducted from the total state appropriation and added to the total for tuition and fees. (NCES, 2005)

Non-federal government appropriations-Revenues from both state appropriations and local appropriations, education distract taxes, and similar support as defined below.

State appropriations-State appropriations are amounts received by the institution through acts of a state legislative body, except grants and contracts and capital appropriations. Funds reported in this category are for meeting current operating expenses, not for specific projects or programs.

Local appropriations, education district taxes, and similar support-Local appropriations are government appropriations made by a governmental entity below the state level. Education district taxes include all tax revenues assessed directly by an institution or on behalf of an institution when the institution will receive the exact amount collected. These revenues also include similar revenues that result from actions of local governments or citizens (such as through a referendum) that result in receipt by the institution of revenues

based on collections of other taxes or resources (sales taxes, gambling taxes, etc.). (NCES, 2005)

Other sources of income-Other sources of revenues would include the following: federal operating grants and contracts, state operating grants and contracts, local operating grants and contracts, other operating sources, federal appropriations, federal nonoperating grants, state nonoperating grants, local nonoperating grants, gifts (including contributions from affiliated organizations), investment income, other nonoperating revenues, and total other revenues and additions. (NCES, 2005)

Overall expenditure structure/patterns-The expenditures were grouped into the five categories of (1) instruction, (2) academic support, (3) student services, (4) institutional support, and (5) other expenses.

Instruction-A functional expense category that includes expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public service that are not separately budgeted. Includes general academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and regular, special, and extension sessions. Also includes expenses for both credit and non-credit activities. Excludes expenses for academic administration where the primary function is administration (e.g., academic deans). Information technology expenses related to instructional activities if the institution separately budgets and expenses information technology resources are included (otherwise these expenses are included in academic support). (NCES, 2005)

Academic support-A functional expense category that includes expenses of activities and services that support the institution's primary missions of instruction, research, and public service. It includes the retention, preservation, and display of educational materials (for example, libraries, museums, and galleries); organized activities that provide support services to the academic functions of the institution (such as a demonstration school associated with a college of education or veterinary and dental clinics if their primary purpose is to support the instructional program); media such as audiovisual services; academic administration (including academic deans but not department chairpersons); and formally organized and separately budgeted academic personnel development and course and curriculum development expenses. Also included are information technology expenses related to academic support activities; if an institution does not separately budget and expense information technology resources, the costs associated with the three primary programs will be applied to this function and the remainder to institutional support. (NCES, 2005)

Student services-A functional expense category that includes expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program. Examples include student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction outside the normal administration, and student records. Intercollegiate athletics and student health services may also be included except when operated as self-supporting auxiliary enterprises. Also may include information technology expenses related to student service activities if the

institution separately budgets and expenses information technology resources (otherwise these expenses are included in institutional support). (NCES, 2005)

Institutional support-A functional expense category that includes expenses for the day-to-day operational support of the institution. Includes expenses for general administrative services, central executive-level activities concerned with management and long range planning, legal and fiscal operations, space management, employee personnel and records, logistical services such as purchasing and printing, and public relations and development. Also includes information technology expenses related to institutional support activities. If an institution does not separately budget and expense information technology resources, the costs associated with student services and operation and maintenance of plant will also be applied to this function. (NCES, 2005)

Other expenses-Other expenses would include the following: research, public service, operation maintenance of plant, depreciation, scholarships and fellowships expenses, other expenses and deductions, total nonoperating expenses and deductions. (NCES, 2005)

Delimitations and Limitations

Although this study examined the relationship between overall revenue and expenditures structures/patterns and retention rates of public 2-year institutions, there were both delimitations and limitations to this study.

The first delimitation is that this sample was drawn from public 2-year educational institutions within a specific geographical area and may not be generalizable to other public 2-year institutions or other postsecondary populations. The second delimitation is in the

nature of the independent variable categories themselves. Since revenue and expenditures encompass many variables, it may be difficult to pinpoint the individual effect of each element within each category on retention rates.

There are also limitations to this study pertaining to the dependent variables. First, since retention rates were available only for the 2003-2004 fiscal year, some of the findings of this study may not be generalizable to other time periods. Also, these variables are measures of voluntary persistence through the educational process and do not account for voluntary withdrawals, student achievement of goals, and/or subsequent reenrollments. Additionally, some community college students may not have the goal of continuing their education for more than one year and this model does not take into account the expectations of the students upon admission to college. Finally, due to changes in some of the data collections procedures and the reporting formats from the old requirements to the new Government Accounting Standards Board (GASB) requirements within the timeframe of this study, the financial data may not be entirely comparable over the time period.

Significance of this Study

There has been significantly more research that addresses how student characteristics impact retention rates than how institutional characteristics impact these rates (Berger, 2001-2002). A study of the relationship between institutional characteristics and retention rates of public 2-year educational institutions is important for several reasons. First, understanding these relationships can help institutions evaluate their financial strategies to improve student outcomes. Second, the results of this study may serve as evidence to support institutional efforts in obtaining certain forms of revenue that could potentially benefit student performance. The further importance of this study would be the positive impacts to the

students and the community as a result of students achieving greater educational attainment. Finally, this study should contribute to the general knowledge and research in higher education and student outcomes.

Summary

The purpose of this study is to understand the relationship between the institutional characteristics of public 2-year educational institutions and their retention rates. It is the intended goal of this study to obtain an understanding of how an institution's characteristics and revenue and expenditure structures/patterns impact student retention rates in an effort to assist organizations in their configuration of resources to improve these rates. This chapter provided information related to the context of the problem as well as the identification of the research questions and their significance. The following chapters provide a literature review as related to this research, discuss the methodology and results, and discuss the implications of these findings.

CHAPTER 2. LITERATURE REVIEW

Overview

This literature review was organized around both the theoretical framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence. Because the resource dependence theory looks at the use of resources, this literature review provides some background information on the history of community colleges, identifies financial patterns of community colleges and discusses the organizational behavior of community colleges. The conceptual framework of the organizational nature of student persistence looks at how organizational behaviors impact students, thus, the literature review discusses accountability and efficiency as well as reviews research studies on student outcomes. This literature review should prove to provide necessary background information and a richer context for the research.

American Community Colleges

A Historical Perspective

The history of the community college begins in the 1890's when William Rainey Harper, the president of the University of Chicago, noticed the number of overcrowded classes and under-prepared students. It was his dream to have a college that could focus its resources on the education of junior and senior level students rather than the first two years of college. At the same time, J. Stanley Brown, the principal of the local Joliet, Illinois, high school noticed many students who were eager to continue their education beyond the secondary level yet were either not fully academically prepared or could not afford the university. The two men worked together to establish Joliet Junior College in 1901 and it still exists today as the "oldest continuously existing public 2-year college" in the United States

(Phillippe & Patton, 2000, p. 4). Thus began the mission of the community college to provide transferability to its students.

During the 1920s and 1930s, there was much discussion as to where the community college should fit into the academic framework—whether they were "expanded secondary schools or truncated colleges" (Cohen & Brawer, 2003, p. 11). A 6-4-4 model was proposed to school districts (grades 1-6 in elementary school, grades 7-10 in middle school, and an expanded high school with grades 11-14). Very few schools organized themselves under this system, though, and arguments instead turned toward having the institutions separate from the secondary school systems.

The mission of the community college stayed that of liberal arts studies until the 1930s when community colleges began offering job-training programs during the Depression in an effort to ease the widespread unemployment in the United States (Phillippe & Patton, 2000). "In 1948, the Truman Commission suggested the creation of a network of public, community-based colleges to serve local needs" (Phillippe & Patton, 2000, p. 5).

The number of community colleges more than doubled during the 1960's alone and this growth "was funded by a robust economy and supported by the social activism of the time" (Phillippe & Patton, 2000, p. 5). In March 1970, President Nixon endorsed the community college in a message to Congress, stating:

> 2-year community colleges and technical institutes hold great promise for giving the kind of education which leads to good jobs and also for filling national shortages in critical skilled occupations. A dollar spent on community colleges is probably spent as efficiently as anywhere in the educational world. The colleges, moreover, have helped many communities forge a new identity. They serve as a meeting ground for

> young and old, black and white, rich and poor, farmer and technician. They avoid the isolation, alienation, and lack of reality that many young people find in multiversities or campuses far away from their community. (Palinchak, 1973, p. 107)

Palinchak (1973) concluded that this message was one of the first public messages to link opportunity to the community college yet, at that time, even with community colleges costing around two hundred dollars per year, only one-fourth of American families were able to afford attendance.

Currently, community colleges "operate in every state and enroll half of the students who begin college in the United States" (Cohen & Brawer, 2003, p. 18). This expansion in campuses and students has also been accompanied by a mission expansion. Although the three basic areas within a community college are academic transfer preparation, vocational-technical education, and community service, today's community colleges also have various curricular functions which usually include continuing education/noncredit courses and programs, developmental/remedial/adult basic education, workforce development, dual enrollment, and distance education (Cohen & Brawer, 2003).

Continuing Education/Noncredit Courses and Programs

Continuing education has evolved as a way to respond quickly to community needs. In 1947, a Texas college adopted the slogan: "We will teach anyone, anywhere, anything, at any time whenever there are enough people interested in the program to justify its offering" (Cohen & Brawer, 2003, p. 22). Yet, Breneman and Nelson (1981) stated that to be able to provide a wide range of community-based learning, some form of negotiated funding would be necessary. "It is difficult to see how the diverse and wide-ranging activities of such a learning center could meaningfully be reduced to well-defined work load measures, such as

the FTE student, that are the central elements of formula budgeting.... The dilemma is that negotiated budgets may not permit the flexibility and local initiative required if the learning center is to respond rapidly and effectively to changing community needs" (Breneman & Nelson, 1981, p. 184).

Cohen and Brawer (2003) contend that state officials give lower priority to continuing education/noncredit courses than they do to traditional, academic and occupational functions. "Historically, community services have been funded by local sources, and as community college finance shifts toward the state level, funding becomes more precarious" (Cohen & Brawer, 2003, pp. 304-305). Of the 46 states that responded to a survey by the Center for Community College Policy (2000), 21 (46% of respondents) stated that they received some state support while the remaining 54% responded that they did not receive any state support for their noncredit courses.

Developmental/Remedial/Adult Basic Education

"Since New Jersey began giving its College Basic Skills Placement Test in the early 1980's, half and more of the students entering the ... (community) colleges have needed remediation in verbal skills, computation, and algebra" (Cohen & Brawer, 2003, p. 261). Although with such a great need for remedial education, many legislatures have been frustrated by the need to fund remediation since they feel as though they are funding the same students at public institutions twice—at the secondary level and again at the community college level—arguing that "if we allow students to retake basic skills courses, we encourage high school complacency and diminish college quality" (McCabe, 2000, p. 3).

McCabe (2000) would argue that we *should* pay for the education of those students twice. He stated four reasons as to why it makes sense that remediation is a necessary

obligation of the states. The first reason was that a gap exists between many high school graduation requirements and the requirements for college entry. Secondly, many high schools still have outdated general/occupational curriculum. Also, students from low-income families are often at a disadvantage and will still be behind other students when entering a community college. Finally, he stated that many students are not mature enough to enter college immediately following high school and may need skills refreshed.

In a study of 25 community colleges across the country that was aimed at finding out whether or not remedial education will continue to be a necessity at community colleges, McCabe (2000) found the following:

- "nearly half of community college remedial education students successfully complete their programs, ...
- successfully remediated students perform well in standard college work, ... [and]
- students who are successfully remediated become productively employed" (p. 31-33).

He also established that remediation programs are not funded at the levels necessary for success. The Community College Policy Center (2000) found that only 8 states reported remedial funding from their general fund, and 26 funded remedial courses in the same way as other credit courses. Additionally, 10 states were funded through their funding formulas, although McCabe (2000) found that "in states that use program cost data for developing funding formulas, community colleges were their own worst enemies...[since] expenditure-driven funding formulas produce low-cost projections, thus systematically underfunding the programs" (p. 39).

Workforce Development

In 1973, President Nixon signed the CETA (Comprehensive Employment and Training Administration) into law, which was focused on providing "fully subsidized public-service jobs for disadvantaged citizens" (McCabe & Pincus, 1997, p. 3). CETA was not a success and, by the time it expired in 1982, had a "pricetag of 53 billion dollars with failures well chronicled by the media and government officials" (McCabe & Pincus, 1997, p. 3).

In 1982, President Reagan began JTPA (Job Training Partnership Act) which was a program designed to increase skills rather than to create jobs. "JTPA called for each state to determine the policy and administration of the training programs within its jurisdiction ... [and] this maintained the emphasis on local administration within state policy" (McCabe & Pincus, 1997, p. 4).

The Community College Policy Center (2000) contends that workforce development is "the fastest-growing area of college services in many states [yet] many state policymakers are struggling...with deciding the appropriate balance between using state dollars as a tool to encourage economic development and subsidizing what should be private-sector responsibility" (p. 30). They found that 19 states provide support for workforce development as a part of the community colleges' appropriation, 32 have access to other state funding sources, and 31 have non-state funding sources for workforce development.

McCabe (1997) feels as though the community college will continue to be the nexus for workforce development because of the following reasons:

- They have the right locations.
- They have the right values and attitudes.
- They have the right programs.

- They have comprehensive services.
- They are flexible and creative.
- They are leaders in education.
- They are committed to serving dependent Americans.
- They are the most cost effective.
- They are involved with local business, industry and community.
- They are the first choice of adult occupational students.
- They provide unique opportunities for career ladders. (p. 23)

Dual Enrollment

Dual enrollment allows for high school juniors and seniors to earn college credits by allowing for the students to be enrolled in a community college for classes that can be applied to both their high school and college requirement. Andrews (2001) found that "fourteen states reported having specific laws or policies addressing early options programs such as dual-credit ... : Arizona, Colorado, Florida, Georgia, Idaho, Indiana, Iowa, Michigan, Minnesota, North Dakota, Ohio, Oklahoma, Virginia, and Washington, ... [and a total of] 44 states have some type of postsecondary option for students available" (pp. 12-13).

With so many students enrolled in both the secondary school and college, which institution is able to claim those students as their own for funding purposes? The Community College Policy Center (2000) found that 31 states report that dual enrollment does generate state support for their community colleges and 19 of those responded that the funding is done in the same manner as other credit funding. In 25 states, the school district keeps the entire amount of state funding for dually-enrolled students (Community College Policy Center, 2000).

Distance Education

Changes in technology have transformed education from the standard delivery methods to a variety of distance education methods. In 1997-1998, "62 percent of public 2-year institutions offered some form of distance education, with one-way prerecorded video [being] the most common type" (Cohen & Brawer, 2003, p. 184). Although this presented many opportunities for community colleges, "funding distance-learning offerings at community colleges raises a host of policy questions because traditional funding formulae typically distinguish between students based on physical boundaries" (Community College Policy Center, 2000, p. 41).

In 2000, the Community College Policy Center found that community colleges in 31 states charged the same tuition rates for in-state and out-of-state distance education students while 29 states charged out-of-state tuition to nonresident community college students. Additionally, community colleges in 31 states reported that distance education courses generated the same FTE as traditionally-delivered courses.

Financial Patterns of Community Colleges

General Financial Issues

In the early years of higher education, community colleges experienced rapid, sustained growth with budgets growing as fast as enrollments and changes in students' demands being accommodated by increased overall budgets (Benjamin & Carroll, 1998). There was an intense national debate over higher education funding in the late 1960's that questioned whether the goal of higher education should be that of developing and improving the institutions or facilitating the access of students and, at that time, the general consensus was towards the goal of student access (Bowen, 1980).

Over the years, higher education expenditures and revenues have changed substantially although different types of higher education institutions (private/public, 2-year/4-year) have had very different experiences (Blasdell, McPherson, & Schapiro, 1993). Since the American higher education system has become almost wholly reliant on enrollments for its support, it has created a shift of power from the institutions to the students who, in turn, carry with them the bulk of the institutions' revenues (Bowen, 1980). This has created a system in which the less affluent institutions cannot attract students because they have inadequate resources in which to serve those students and, yet, they are the institutions who need those resources the most (Bowen, 1980).

The current governance system that has emerged is "highly decentralized in that individual units and departments have a great deal of autonomy over how they allocate their resources. In the typical institution or system, the various academic and administrative units operate independently and in isolation from one another" (Benjamin & Carroll, 1998, p. 100).

To move ahead, leaders of higher education must build coalitions with each other and must work together in the already largely consensual governance that exists (Benjamin & Carroll, 1998). They must analyze cost and revenue data in an effort to make fiscal management tools the "fabric" of their decision-making processes if they will ever be able to move ahead in a systematic, consensual manner (Dellow & Losinger, 2004). Benjamin and Carroll (1998) concluded that the following needs to be done:

> Governance would be at the university level, the equivalent of the commons. However, all departments and other decision-making units would have to believe they not only had a stake in the outcome of decisions made but an opportunity to influence

> the outcome as well. Universities will probably have to move toward a flatter, better networked, decentralized governance structure above departments and below much of current central administration. Layers of deans and associate vice presidents will probably be eliminated over the next decade. Networks of faculty and administrators will replace them. Just how the new governance structure will be articulated will differ from one higher education institution to the next based on the particular historical development of each institution or system of institutions. (pp. 113-114)

Revenue Patterns

Kenton, Huba, Schuh, and Shelley (2005) found that there were substantial differences in the community colleges they studied in their dependence on sources of revenues with the greatest differences being found within the categories of state appropriations, local appropriations, and tuition and fees. As may be expected, as state appropriations decreased for most community colleges, the reliance on tuition and fees increased. Kenton, Huba, Schuh, and Shelley (2005) found that of those community colleges studied that experienced declines in state appropriations, 75% responded by increasing their tuition and fees. Additionally, the state appropriation process varied widely from state to state as 29 states use a funding formula and 32 states share in a single consolidated appropriation either for just community colleges or for all institutions of higher education (Center for Community College Policy, 2000).

Tuition and fees of public 2-year colleges had a 340% increase from 1976-1977 to 1995-1996 which was fairly close to the increases experienced by the other sectors of higher education institutions over the same period: 342% for independent 2-years, 362% for public 4-years, and 383% for independent 4-years (American Association of Community Colleges,

1998). The median household income increased by only 189% over the same period (American Association of Community Colleges, 1998). Additionally, the percentage of median household income that would be required to pay tuition and fees at each of the different types of institutions differed greatly. Even with these measures, community college tuition and fees were around one-tenth of the average tuition and fees of independent 4-year colleges: public 2-year colleges would require only 2.5% of the median household income as compared to 5.7% for public 4-years, 14.2% for independent 2-years, and 24.7% for independent 4-years (American Association of Community College, 1998). Table 1 shows the average cost of tuition and fees for 1998-1999 for community/technical colleges, 4-year state colleges and universities, and 4-year research universities.

When revenue was analyzed by college sector, it was found that state funding at public 2-year colleges, when adjusted for inflation, actually had decreased by 10.3% from 1976-1977 to 1995-1996. Additionally, both types of 4-year colleges (public and independent) also have experienced decreases, with the public colleges decreasing by 7.4% and the independent colleges decreasing by 6.9% (American Association of Community Colleges, 1998). The only increase in state funding (31.1%) was experienced by the independent 2-year colleges (American Association of Community Colleges, 1998), yet, "despite the rapid increase in institutional aid at private 2-year colleges, the net price to students at such institutions increased relative to public 2-year colleges" (Blasdell, McPherson, & Schapiro, 1993, p. 31). Again, these decreases in state funding were determined to be the probable causes for the increases in tuition and fees as illustrated above. Table 2 shows the percentage breakdown of revenues for community colleges for 1998-1999 into the categories of federal, state, local, tuition/fees, and other revenue.

Table 1. Average Cost of Tuition and Fees (1998-1999)

State	Community/Tech Colleges	4-Yr State Colleges & Universities	4-Year Research Universities
AK	$1,556	$1,836	
AL	$1,235	$2,475	
AR	$917	$2,540	$3,181
AZ	$831		
CA	$360	$1,889	$4,037
CO	$1,557	$2,381	$3,825
CT	$1,814	$3,667	$5,330
DE	$1,380	$4,421	
FL	$1,342	$2,114	
GA	$806 (CC) / $1,180 (Tech)	$1,730	$2,310
HI	$1,004	$2,050	
IA	$1,613	$2,867	
ID	$1,318	$2,540	$3,295
IL	$1,318	$2,540	$3,295
IN	$2,268	$3,135	$3,627
KS	$1,200	$2,300	
KY	$1,100		
LA	$1,147	$2,141	$2,841
MA	$2,293	$3,104	$4,741
MD	$2,188	$4,310	
ME	$2,910		
MI	$1,631		
MN	$2,064	$2,605	
MO	$1,378	$2,819	$4,504
MS	$1,016		
MT	$1,619	$4,009	$4,009
NC	$560	$1,416	
ND	$1,592	$1,906	$2,408
NE	$1,346	$3,223	
NH	$3,520		
NJ	$1,904	$3,347	$4,906
NM	$634	$1,748	$2,258
NV	$1,230	$2,520	
NY	$2,354	$3,400	$3,400
OH	$2,299	$2,573	$4,379
OK	$945	$1,485	$1,890
OR	$1,688		
PA	$2,042	$4,302	$5,872
RI	$1,746	$3,260	$4,928
SC	$1,072	$3,408	$3,369
TN	$1,130	$1,906	$2,090
TX	$808	$2,034	$2,340
UT	$1,429	$1,953	$2,478
VA	$1,385		
VT	$2,472	$3,924	$7,248
WA	$1,584	$2,640	$3,460
WI	$1,925		
WV	$1,348	$2,194	$2,662
WY	$1,301		

Source: Center for Community College Policy, 2000.

Table 2. Percentage Breakdown of Revenues for Community Colleges (1998-1999)

State	Federal	State	Local	Tuition/Fees	Other
AK	0.60%	44.40%	16.90%	15.20%	22.90%
AL	22.04%	47.24%	9.71%	21.01%	
AR		71.00%	3.00%	22.00%	4.00%
AZ	1.00%	21.00%	57.00%	20.00%	1.00%
CA	3.80%	50.90%	44.50%	0.80%	
CO	16.00%	42.00%	1.00%	24.00%	17.00%
CT		71.00%		19.00%	10.00%
DE	5.00%	57.00%	11.00%	17.00%	10.00%
FL	0.25%	68.51%	0.02%	23.06%	8.00%
GA	10.00%	63.00%	14.00%	13.00%	
HI	2.70%	61.80%		16.80%	18.70%
IA	3.21%	45.66%	5.89%	38.97%	6.27%
ID		46.20%	30.10%	17.80%	5.90%
IL	0.08%	25.77%	43.24%	26.93%	3.97%
IN		62.30%		37.70%	
KS	2.00%	24.00%	40.00%	16.00%	18.00%
KY	15.61%	54.15%	0.01%	17.60%	12.63%
LA	17.00%	55.00%		21.00%	7.00%
MA	18.00%	42.00%		24.00%	16.00%
MD		26.90%	33.40%	35.70%	3.94%
ME	4.00%	46.00%		22.00%	28.00%
MI	0.30%	26.50%	25.00%	23.20%	25.00%
MN		62.40%		36.50%	1.10%
MO	2.00%	41.00%	26.00%	24.00%	7.00%
MS	5.09%	52.25%	12.48%	18.43%	11.75%
MT		43.00%	23.00%	20.00%	14.00%
NC	3.20%	75.20%	12.90%	8.20%	0.50%
ND		49.00%	23.00%	28.00%	
NE		35.00%	37.00%	21.00%	7.00%
NH	13.00%	47.00%		40.00%	
NJ		24.00%	30.00%	42.00%	4.00%
NM	1.80%	59.60%	25.30%	13.20%	0.10%
NV	7.78%	63.30%	0.28%	23.05%	5.59%
NY	5.70%	29.00%	31.30%	34.00%	
OH	2.71%	45.29%	16.73%	32.21%	3.05%
OK	0.20%	59.70%	11.90%	19.80%	8.40%
OR	11.50%	39.90%	19.90%	16.20%	12.50%
PA	6.20%	35.70%	18.30%	35.70%	4.10%
RI		63.00%		34.00%	3.00%
SC	19.00%	45.00%	10.00%	24.00%	3.00%
TN	0.60%	66.50%		29.90%	3.00%
TX	14.40%	37.90%	17.90%	19.90%	9.80%
UT		52.00%		25.00%	23.00%
VA	7.80%	57.70%	0.40%	30.70%	3.40%
VT	0.30%	14.00%		81.30%	4.40%
WA	5.00%	59.00%		17.00%	19.00%
WI	4.00%	21.00%	53.00%	16.00%	
WV	22.00%	51.00%		21.00%	6.00%
WY		63.00%	18.00%	19.00%	

Source: Center for Community College Policy, 2000.

Blasdell, McPherson, and Schapiro (1993) found that there were declines in revenues from gift endowments at both public 4-year and 2-year institutions, yet these declines, just like the declines in state appropriations, were offset by the increase in tuition and fees. Kenton, Huba, Schuh, and Shelley (2005) found in their study of Midwestern community colleges that the income from grants, private gifts, and endowments was "extremely modest" and represented only a fraction of their total revenue (p. 118).

Expenditure Patterns

The American Association of Community Colleges (1998) found that community colleges have the lowest costs per FTE student of all types of colleges. It also was found that community colleges spent (in 1994) 77% of their budget on instruction and faculty salaries, which was the largest percentage spent in these categories of all educational institutions. Additionally, as shown in Table 3, the total hours per week that full-time faculty spent teaching credit courses in 1993-1994 was more than for any other type of educational institution:

Table 3. Hours per Week Full-Time Faculty Spend Teaching

Type of Institution	**Public**	**Independent**
Community College	16.4	12.8
Liberal Arts	N/A	10.6
Comprehensive 4-year	11.4	11.4
Doctoral, no medical	7.5	6.7
Doctoral, with medical	9.7	8.4

Source: American Association of Community Colleges, 1998.

Bowen's (1980) study of 268 institutions showed wide differences in their costs per student, even when these institutions were grouped with other closely-similar institutions by geographic area, price levels, etc. Bowen offered several theories to account for these differences. One theory focused on the diversities within the educational systems and

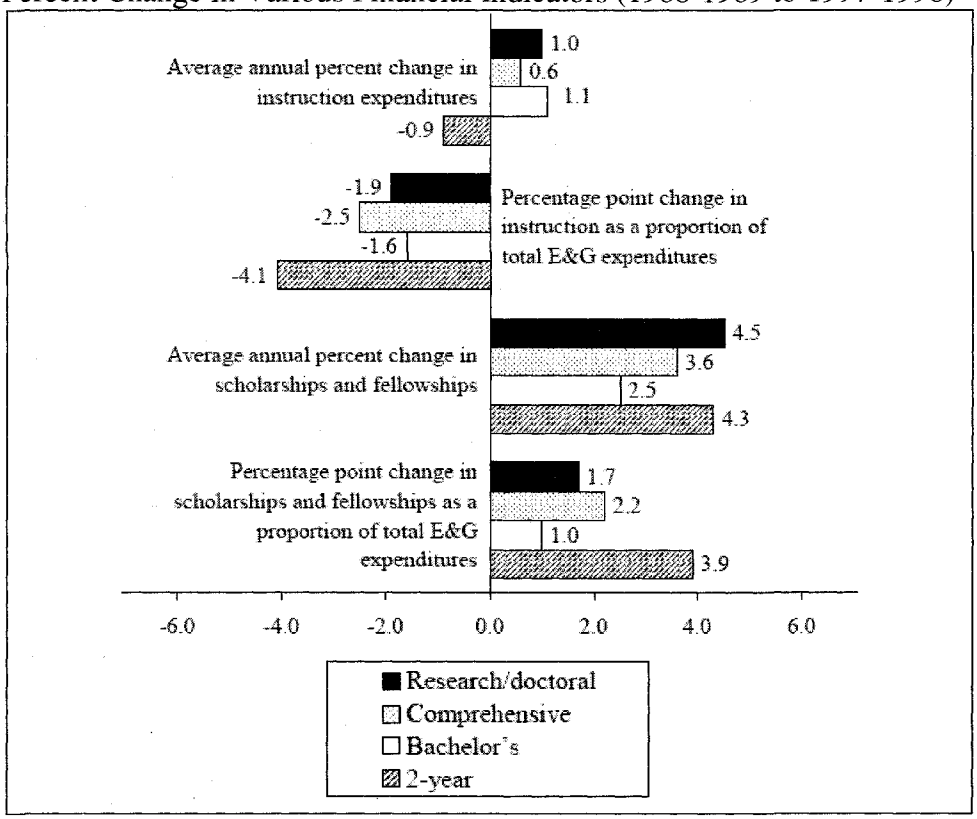
students served. Another explained this diversity in spending patterns by differences in spending patterns between affluent institutions and less-affluent institutions although Bowen argued that the less-affluent institutions are an "indispensable part of the higher education system ... [since they] are small and provide a personalized atmosphere" (Bowen, 1980, p. 248). A final theory centered around academic freedom, stating that "academic freedom, which everyone admits is essential on non-economic grounds, will almost inevitably result in cost differences which appear to reflect uneconomical allocations of resources" (Bowen, 1980, p. 129).

Blasdell, McPherson, and Schapiro (1993) determined that the net spending per student at private institutions was approximately double that of the net spending per student in the public sector. Blasdell, McPherson, and Schapiro (1993) also found that, when they categorized spending into several groups, there were large spending differences (privates spending more than publics) in instruction and self-supported research as well as in almost all other spending areas. During the 10 years studied, public and private spending per student on plant and equipment had gone from being almost identical to more than doubling in the private institutions. The only exception was that public institutions spend slightly more per student than private institutions in the area of public service. Additionally, it was determined that this spending gap in these categories had widened consistently over the 10 years studied, and it was suggested that this gap might continue to widen.

Cunningham, Wellman, Clinedinst, and Merisotis (2001) examined expenditures at both private not-for-profit and public educational institutions, and found that instructional expenditures constituted the largest portion of total expenditures but "remained flat or decreased as a proportion of E & G [education and general] expenditures" (p. vi). The fastest

growing expenditure was found to be institutional scholarship and fellowships. Additionally, this model found that changes in revenue and expenditure categories accounted for a very low percentage of the variation in tuition changes over the entire period of analysis—7.3%—in comparison with the public 4-year sector, which had values ranging from 39.1% for research/doctoral institutions to 61.3% for comprehensive institutions" (Cunningham, Wellman, Clinedinst, & Merisoti, 2001, p. ix). Figure 2 shows the percent change in the various financial indicators from 1988-1989 to 1997-1998 for research/doctoral, comprehensive 4-year, 4-year, and 2-year institutions.

Figure 2. Percent Change in Various Financial Indicators (1988-1989 to 1997-1998)



Source: Cunningham, Wellman, Clinedinst, & Merisotis (2001).

Perspectives on Organizational Behavior

Colleges and universities are similar to other types of organizations in that "they have goals, hierarchical systems and structures, officials who carry out specified duties, decision-making processes that set institutional policy, and a bureaucratic administration that handles routine business" yet they also have several differences that make them unique organizations and have leadership needs that differ from traditional businesses (Baldridge, Curtis, Ecker, & Riley, 1977, p. 483). The complexity of an institution of higher education is one of "organized anarchy" or an "organization in which generous resources allow people to go in different directions without coordination by a central authority" (Baldridge, Curtis, Ecker, & Riley, 1977, p. 486). There are four main differences between a traditional business and an institution of higher education that create the existence of this "organized anarchy."

The first difference is the lack of clearly defined goals or what could be called goal ambiguity. "Colleges and universities have vague, ambiguous goals and they must build decision processes to grapple with a higher degree of uncertainty and conflict" (Baldridge, Curtis, Ecker, & Riley, 1977, p. 483). These institutions tend to lack the existence of a single, clearly defined mission (as found in most businesses) and lack agreement within themselves as to which direction they should be moving.

Another difficulty faced by institutions of higher education is that they perform a client service as opposed to the material-processing services performed by many traditional businesses. This is an important distinction because "clients demand and often obtain significant input into institutional decision-making processes" (Baldridge, Curtis, Ecker, & Riley, 1977, p. 484).

The third difficultly faced by institutions of higher education exists due to the employees' degree of professionalism. Because these organizations must hire highly educated professionals, these employees have different needs and loyalties than other business professionals tend to have. Typically, these employees tend to demand both autonomy and peer evaluations and they tend to be split between being loyal to their institutions or to their respective disciplines (Baldridge, Curtis, Ecker, & Riley, 1977). This, coupled with the fact that these employees tend to "demand a large measure of control over institutional decision processes," creates a challenging leadership situation (Baldridge, Curtis, Ecker, & Riley, 1977, p. 486).

The fourth difficulty is that institutions of higher education must be adaptable both externally to their changing environmental needs and internally to the technological demands to serve their clients effectively. These institutions are "becoming more and more *vulnerable to their environments*" and responsive to market demands rather than autonomous (Baldridge, Curtis, Ecker, & Riley, 1977, p. 486). Internally, for these organizations to continue to serve both their employees and clients effectively, "their technology must be holistic and adaptable to individual needs" rather than clearly preset by an administrative dictate (Baldridge, Curtis, Ecker, & Riley, 1977, p. 486).

Cameron and Ettington's (1988) study of 334 colleges and universities found that there were five different types of organizational cultures present in institutions of higher education: incongruent, clan, adhocracy, hierarch, and market. Furthermore, their study found that "the effectiveness of institutions is more closely associated with the type of culture present than with the congruence or strength of that culture. The major attributes and

emphases of culture tend to be associated with high effectiveness in comparable domains" (Cameron & Ettington, 1988, p. 385).

Resource Allocation Systems

Massy (1996b) presented several strategies for institutions to use in their approach to dealing with the changing environments of higher education and the current financial difficulties faced by many institutions: a top-down strategy, a broad-based strategy, and a responsibility center strategy.

The top-down strategy refocuses the administrative and support function as well as academic programs by either eliminating or downsizing them. This traditional system of reallocating resources could result in layoffs of employees as well as the elimination of programs/departments yet the long-term result would be a reengineered resource allocation so that these painful actions could be avoided in the future.

The broad-based strategies are based on continuous quality improvement (CQI) and require a decentralization of the improvement process to the individual worker level. Although this strategy takes longer to implement, it empowers employees (when supplied with the necessary tools and training) to be responsible for their own continual improvement. Casper and Henry (2001) also advocate a similar performance-oriented model that could be used with objective performance variables to enable institutional leaders in their decision-making process.

Finally, a business approach of using responsibility centers has been recommended for institutions to deal with declining resources (Massy, 1996b; Strauss, Curry, & Whalen, 1996). Responsibility centers allow for departments/programs to act as separate entities and produce separate accounting records. Strauss, Curry, and Whalen (1996) stressed that the

most important aspect of the use of these centers is the need for incentives to each responsibility center both to enhance revenues and control costs. "On the revenue side, responsibility center budgeting focuses more attention on the importance of tuition revenue and on the professors or courses likely to attract that revenue ... [and] ... on the other side, the members of a center become more aware of the total costs of the enterprise including benefits, financial aid, and overheads, since these are no longer charged to other units in the accounting" (Strauss, Curry, & Whalen, 1996, pp. 170-171). Additionally, the business concept of cost-benefit analysis could be used as another measure of productivity by responsibility centers.

Multiple Missions of Community College

Bailey and Morest (2003) studied whether the comprehensiveness of the missions of the community colleges was a deterrence to their organizational efficiency. The community college missions were categorized as core, vertical, and horizontal missions. Core missions consist of the college activities that lead to a degree (or certificate). Vertical missions were identified as those missions that worked in connection with high schools (like tech-prep and dual enrollment programs) and articulation to 4-year colleges and universities. Honors programs were included under the umbrella of vertical missions. Horizontal missions were identified as programs within the community college outside of the core degree-granting programs such as continuing education and workforce development.

The causes of mission expansion were identified as the need for community colleges to be responsive to community needs as the only type of institution with the flexibility and comprehensiveness to provide many of the community-needed activities. Bailey and Morest

(2003) concluded that the political nature of community colleges has played a role in their mission expansion, which has moved them away from "focused organizational efficiency."

Bailey and Morest (2003) further concluded that, although it may be very difficult to measure, the goals of many of the missions are so different that the integration of the many duties are often duplicated within the colleges. Additionally, due to a great deal of program duplication within the community college, there is an ongoing internal competition for students as well as resources.

Finally, although the potential benefits of a more focused strategy/mission have not been measured and may not ever be measured due to the nature of the community colleges themselves, significant policy changes may be necessary to offset any of the inefficiencies of mission expansion by requiring better integration of the multiple missions within the community college.

Accountability and Efficiency

Productivity Issues in Higher Education

Massy (1996a) noted that there are two incompatible views of productivity. Faculty generally view productivity as "increasing benefits while holding costs constant or...increasing resource utilization while increasing benefits faster," or in other words, "doing more with more" (p. 55). On the other hand, external stakeholders view productivity as "reducing costs while holding benefits constant, ... reducing costs faster than any erosion of benefits, or increasing benefits while reducing costs," which could be looked at as "doing more with less" (Massy, 1996a, p. 55). Massy (1996a) concluded that these divergent views could be reconciled by management implementing an economic approach that attempts to

maximize total benefits subject to limited expenditures—that is, not just improving productivity but improving efficiency.

Cameron (1978) studied organizational effectiveness in higher education and found that "no institution operates effectively on all effectiveness dimensions, but that certain effectiveness profiles are developed in which particular dimensions are emphasized" and can be improved upon (p. 625). Another study found that because productivity/effectiveness could not be measured with singular inputs since most "work in higher education involves teamwork and collectivities at various levels, overlap and interaction among faculty and other professionals, and multidimensional production processes that vary by unit," it is important to manage objectives centrally and to work strategically and collectively toward those institutional goals (Rhoades, 2001, p. 629).

Performance-Based Funding

Performance indicators can be defined as quantitative measures used to compare against themselves over time, against a norm, or against other institutions (Gaither, Nedwek, & Neal, 1994; Taylor & Massy, 1996). Ewell and Jones (1994) defined performance indicators as "a concrete piece of information about a condition or result of public action that is regularly produced, publicly reported, and systematically used for planning, monitoring, or resource allocation at the state or system level ... [which are] intended to be used together, not singly or out of context" (p. 7). It is important to note that the definition of performance indicators includes that they be quantitative, measure performance, and that they are indicators or "signals or guides rather than absolute measures" that can be used for the purposes of monitoring, evaluation, dialogue, rationalization, and allocation of resources (Sizer, Spee, & Bormans, 1992, p. 135). The intended goal of using performance indicators is

that they measure organizational behavior and require institutions to be held accountable of the achievement of their mission and goals (Gaither, Nedwek, & Neal, 1994).

History of Performance-Based Funding

In 1974, when the Tennessee Higher Education Commission coordinated the first incentive-based funding initiative for public higher education, it did so with the "main emphasis of ... [promoting] improvement in quality and performance of public colleges and universities" (Tennessee Higher Education Commission, 2002). Since that time, twenty-six more states have required colleges to report on performance indicators in an effort to begin a "paradigm shift wherein colleges are to meet the states' needs rather than the states meeting the colleges' needs" (Community College League of California, 1999).

In a 1990 study, 40 states reported that they actively promoted assessment although not all of those states required assessment (Ewell, Finney, & Lenth, 1990). The American Council on Education found that 97% of all institutions engage in regular assessment activities (Marchese, 1985).

The National Association of College and University Business Officers (NACUBO) launched a program in 1991 to provide benchmarking data and set national standards to compare institutional efficiency and productivity (Gaither, Nedwek, & Neal, 1994). Over the 7 years that the program ran, more than 300 colleges and universities participated providing valuable data on 40 modules containing from 4 to 14 benchmarks each.

In 1991, a study began that evolved into a comprehensive survey of "over 700 colleges and universities [in an attempt] to develop comparative institutional data" (Gaither, Nedwek, & Neal, 1994, p. 28). This study has continued to be updated over time to show trends in the data, and currently contains data on over 1,000 institutions and for more than

100 key indicators with data grouped by institutional type: public 2-year colleges, regional colleges and universities, research universities, and private colleges with tuition and fees in three different cost categories. The indicators gathered have also been grouped into the four main categories of financial, physical, information, and human capital. Massy and Meyerson (1992) called the resulting publication "the most comprehensive effort of its kind ever undertaken in higher education" (p. 47).

Peter Ewell began a study for the National Center for Higher Education Management Systems (NCHEMS) that attempted to identify "good practice indicators" for institutions of higher education. The original indicators developed by Ewell in 1994 were:

- "enrollment and graduation rates by gender, ethnicity, and program,
- degree completion and time to degree,
- persistence and retention rates by grade, ethnicity, and program,
- remediation activities and indicators of their effectiveness,
- transfer rates to and from two- and 4-year institutions,
- pass rates on professional exams,
- job placement data on graduates and graduates' satisfaction with their jobs, [and]
- faculty workload and productivity in the form of student-faculty ratios and instructional contact hours" (Burke, 1998a, pp. 50-51).

Subsequently that same year, the following additional four indicators were added:

- "admission standards,
- total student credit hours by institution and discipline,
- results of satisfaction studies of alumni, students, parents, and employers, [and]
- external or sponsored research funds" (Burke, 1998a, p. 51).

Over time, indicators moved away from ethnicity and gender; "only two states include minority graduates and minority access in their performance funding program" (Burke, 1998a, p. 51). The Ewell study has since developed into the "core indicators of effectiveness" which have been grouped into six categories designed to specifically meet the missions of community colleges (Alfred, Ewell, Hudgins, & McClenney, 1999):

Student Progress

- Core Indicator 1: Student Goal Attainment
- Core Indicator 2: Persistence (Fall to Fall)
- Core Indicator 3: Degree Completion Rates

Workforce Development

- Core Indicator 4: Placement Rate in the Workforce
- Core Indicator 5: Employer Assessment of Students
- Core Indicator 6: Licensure/Certification Pass Rates
- Core Indicator 7: Client Assessment of Programs and Services

General Education

- Core Indicator 8: Demonstration of Critical Literacy Skills
- Core Indicator 9: Demonstration of Citizenship Skills

Transfer Preparation

- Core Indicator 10: Number and Rate Who Transfer
- Core Indicator 11: Performance After Transfer

Developmental Skills

- Core Indicator 12: Success in Subsequent, Related Coursework

Outreach

- Core Indicator 13: Participation Rate in Service Area
- Core Indicator 14: Responsiveness to Community Needs

As of 2002, institutions of higher education were required to report on specific performance indicators in 44 states, of which 18 actually linked the performance indicators to the budget through performance funding: Colorado, Connecticut, Florida, Idaho, Illinois, Kansas, Louisiana, Missouri, New Jersey, New York, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, and Texas (Burke & Minassians, 2002). "Pressures for performance documentation are intensifying for almost every constituency served ... [and] to meet this challenge...colleges will need to ensure that their effectiveness systems are flexible and dynamic" (Alfred, Ewell, Hudgins, & McClenney, 1999, p. 3-5).

Current Indicator Usage

Although a large number of states require the reporting of performance indicators, they are unable to agree on which indicators, or even how many indicators, should be reported—for example, Florida has 40 indicators, South Carolina 37, Colorado 28, Arkansas 14, Kentucky 13, etc. (Community College League of California, 1999). Additionally, since performance indicators are designed to show that an institution's mission has or has not been met and since 4-year and 2-year higher education institutions have drastically different missions, many states require different indicators for 4-year institutions than for 2-year institutions. The Center for Community College Policy (2000) has summarized the states' use of performance indicators for community colleges in Table 4.

Table 4. Summary of Performance Indicators Used in Community Colleges

Number of States	Indicator	States
17	Job Placement	AZ, DE, FL, ID, IL, LA, MA, MD, MO, MS, NC, OK, SC, TN, VA, WA, WY
16	Transfer Rates	AZ, CA, DE, FL, IL, MA, MD, NJ, OH, OK, SC, TX, UT, VA, WA, WY
16	Graduation Rates, Certificates and Degrees Awarded	CA, CO, CT, DE, FL, ID, LA, MA, MD, MO, NJ, OK, SC, TX, VA, WY
14	Retention/Time to Degree	CA, CO, CT, IL, MA, MD, NC, NJ, OK, TN, TX, VT, VA, WY
11	Licensure Pass Rates	CT, MA, MD, MO, MS, NC, OK, SC, TX, UT, WY
10	Remediation Activities	AZ, CA, CT, MD, NC, OH, OK, TX, WA, WY
9	Follow-up Satisfaction Studies (student and employer)	AZ, IL, LA, MA, MD, NC, SC, TN, WY
9	Diversity/Service to Special Populations	AZ, CO, FL, IL, MA, MD, MO, NJ, TX
8	Student Success after Transfer	AZ, CA, IL, MD, MO, MS, NJ, WY
8	Workforce Development Activities/Service to Business	AZ, CA, CT, IL, MA, NC, OH, SC
8	Faculty Workload, Productivity and Preparation	CO, CT, MD, MS, SC, TX, UT, VA
8	Student Learning Outcomes	AZ, CO, CT, IL, MO, NJ, OK, TN
7	Institutional Efficiency	CO, CT, LA, MA, NJ, SC, VA
7	Community Service	AZ, CT, IL, MA, NJ, SC, WY
6	Noncredit Course Offerings	CT, MA, MD, NJ, OH, SC
5	Access and Affordability	CT, MA, MD, OH, SC
5	Enrollment	DE, ID, MA, ME, NC
4	Fundraising Success	MA, MD, NJ, SC
4	Partnerships with K-12 and Concurrent Enrollment	CT, FL, MA, OH
4	Percent of Local Population Served	AZ, IL, MD, WY
4	Class Size	CO, MS, NJ, SC
3	Financial Aid Awards	AZ, CT, MA
3	Distance Education Activities	CT, LA, MA

Source: Center for Community College Policy, 2000.

Finally, as controversial and difficult as it may be for states to agree on which indicators are important to assess higher education, assigning weights to those indicators becomes an even more difficult task sometimes resulting in "heated debates in some states" (Serban, 1998b, p. 63). It is difficult prioritizing those indicators or ranking their importance for the institutions across the state when, admittedly, the missions of those institutions may be very different from one another. Additionally, overall weighting schemes for all institutions of higher education may tend to favor one institutional type, i.e., 2-year or 4-year, over the other.

Attitudes Toward Performance Indicators

When campus leaders were asked about the appropriateness of 18 specific indicators, they rated them as very appropriate to very inappropriate. Table 5 indicates which indicators were felt to be most appropriate, with the percentages ranking the indicators as either "appropriate" or "very appropriate" following each indicator (Nelson A. Rockefeller Institute of Government, 2000).

Overall, it was felt that there was little interstate influence in designing performance-based funding and that each state developed its plan with its own state's goal in mind not taking external influences into account (Serban, 1998a). Additionally, "the selection of performance indicators and success criteria [is viewed] as the major difficulties of [the] planning and implementation" of a performance based funding plan (Serban, 1998a, p. 83).

Table 5. Responses on Appropriateness of Performance Indicators

Indicator	% Ranking as Appropriate /Very Appropriate
Accredited programs	77.0%
Graduate's job placement	71.0%
Professional licensure exams	69.4%
External peer reviews	69.2%
Employer satisfaction surveys	68.2%
Retention/graduation rates	67.0%
Student satisfaction surveys	64.4%
Alumni satisfaction surveys	64.1%
Administrative size/cost	55.4%
Faculty workloads	54.1%
Undergraduate access	51.2%
Standardized test scores	48.8%
Diversity of students	46.5%
Diversity of faculty/staff	44.4%
New student preparation	40.9%
K-12 linkage	40.3%
Two-to-four year transfers	38.9%
Time to degree	35.2%

Source: Nelson A. Rockefeller Institute of Government, 2000.

When campus leaders were surveyed within 5 states using performance-based funding (Florida, Missouri, Ohio, South Carolina, and Tennessee), over half of those responded that performance-based funding had increased their accountability to the states, while only 30.7% felt that it had increased their institutions' responsiveness to the needs of the states (Nelson A. Rockefeller Institute of Government, 2000). Table 6 summarizes the responses from higher education campus leaders on their opinions of the results of performance-based funding.

Table 6. Responses on Results of Performance-Based Funding

Performance-Based Funding Has...	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Other
Improved the performance of our institution	5.0%	25.9%	28.6%	24.7%	9.1%	6.7%
Increased the accountability of our institution to the state	8.5%	42.4%	23.2%	14.5%	4.6%	6.9%
Increased the responsiveness of our institution to the state	4.4%	26.3%	33.6%	21.6%	7.1%	7.0%
Increased the state funding for higher education to our state	2.0%	12.3%	24.4%	29.8%	24.3%	7.2%

Source: Nelson A. Rockefeller Institute of Government, 2000.

When asked the follow-up question of how likely performance-based funding is to continue over the next 5 years in their states, only 2.1% felt that it was unlikely to continue (Nelson A. Rockefeller Institute of Government, 2000).

Return on Education

Krop, Carroll, Vernez, and Rydell (2000) identified the "return" to the state when it used state funds to support education. It estimated that increased educational spending would benefit the state by providing reductions in expenditures on public assistance and social insurance, reductions in expenditures on incarcerations, and increases in local taxes and social insurance programs.

For the average 30-year-old high school drop out, the welfare cost is $620 per year; this figure drops by two-thirds for a high school graduate and is almost zero for a college graduate (Krop, Carroll, Vernez, & Rydell, 2000). The cost of incarcerations was estimated to be, on average, about $29,000 per person per year and, when the population of the state correctional facilities was analyzed, it was found that less than 40% were high school

graduates and less than 5% had bachelor's degrees (Krop, Carroll, Vernez, & Rydell, 2000). With this information, the researchers were able to calculate the savings that could be received from lower incarceration costs.

The final return to the public could be identified as the additional revenue that could be received from the higher educated workforce. The additional revenues were considered to be state income, property and sales taxes, and federal income and payroll taxes.

Taking all of these factors together, the total benefit of paying for education can be calculated. It was found that for each native-born woman (who may have dropped out of high school) who is able to attain a high school diploma, federal and state treasuries gain $75,000 to $95,000 in reduced costs and increased revenues, which are even higher for each native-born man assisted in his attainment of a high school graduation are even higher: $75,000 to $145,000 (Krop, Carroll, Vernez, & Rydell, 2000). These returns could be increased with the attainment of post-secondary education or an associate's degree.

Baum and Payea (2004) found that "by the age of 33, the typical college graduate who enrolled [in college] at age 18 has earned enough to compensate for both tuition and fees at the average 4-year institution and earnings forgone during the college years" (p. 12). This study also found that improved perceptions of health, lower incarceration rates, and aptness to volunteer in the community, and vote positively correlated with education level. Additionally, the children of college graduates were found to have higher cognitive skill levels than the children of less educated parents. Finally, it was found that the government spending on social programs for 30-year-old high school graduates was between $800 and $2,700 more per year than for college graduates.

Krop, Carroll, Vernez, and Rydell (2000) looked at the group of people born in 1990 in an effort to estimate what it would cost and benefit the country to "close the gap" between the educational achievement of different racial groups. They estimated that, between the African American and Hispanic populations and the non-Hispanic white and Asian American populations, to close the gap would be at a taxpayer cost of $9.3 billion but would benefit the taxpayers by returning $23.7 billion or, in other words, for each dollar spent, taxpayers would save about $2.50 in today's dollars.

Research Studies on Student Outcomes

Astin, Korn, and Green (1987) studied the responses from over 8,000 students on the Cooperative Institutional Research Program (CIRP) follow-up surveys and found that the "retention rates for students entering 4-year colleges and universities have declined substantially during the past fifteen years"—dropping to 31.2% from 46.7% in 1970 (p. 38). Additionally, degree completion rates at private institutions are substantially higher than at public institutions (Astin, Korn, & Green, 1987) and "undergraduate students succeeded at higher rates at research-oriented institutions than at colleges and universities with prevailing emphases on undergraduate education" (Hamrick, Schuh, & Shelley, 2004).

Females have been found to have higher persistence rates than males between the first and second year of college (Berger & Milem, 1999). Although it was also found that females were more likely than males to complete a bachelor's degree within a 4-year period, it also was found that 53.0% of men as compared to 51.4% of women ultimately would complete their degrees (Astin, Korn, & Green, 1987). Thus, although more men complete their degrees, they take a longer time to do so.

High school grade-point average has been found to be an important predictor of student success (Berger & Milem, 1999). Also, the grade-point average of the students as they proceed through college is one of the main factors that positively affects retention (Pascarella & Terenzini, 1991; Wilder, 1983).

Parents' incomes and past educational experiences also seem to have an effect on students' success (Berger, & Milem, 1999). Parental/family income has a positive impact on student persistence and the "education level of either parent seems to be related to the education plans of the student" although students do tend to identify most with (i.e., follow the same educational plan) of the parent of the same gender (Isaac, Malaney, & Karras, 1992, p. 601).

Organizational Behavior and Student Outcomes

"Higher levels of collegial organizational behavior on campus have positive effects on student satisfaction and on student persistence" (Berger, 2001-2002, p. 12). There are three important organizational behaviors that either positively or negatively correlate with student persistence: learning communities, bureaucratic environment, and political climate.

Learning Communities

"Institutions *can* control their dropout rates to a great extent based on the energy and effort that is put into getting students started right on the path into and through the first year of college" (Levitz, Noel, & Richter, 1999, p. 36). "Lack of integration, or isolation of the student within the institution, has been identified as an important factor in contributing to student departure" (Nagda, Gregerman, Jonides, von Hippel, & Lerner, 1998, p. 57). Additionally, Chapman and Pascarella (1983) found that larger colleges already have greater rates of student involvement in campus social activities than do smaller colleges, although

the students in these larger colleges have less contact with faculty, and "2-year college students were low in both academic and social integration relative to students in other types of institutions" (p. 319).

The "involvement" model (Astin, 1984; Berger & Milem, 1999) stresses the importance of early involvement in the first year with both peers and faculty, and that one of the most important determinants in graduation rates is the first-year to second-year attrition rate since "attrition rates are halved each subsequent year after the first year" (Levitz, Noel, & Richter, 1999, p. 37). Thus, through the use of learning communities during their first year, students can become more involved with their peers and faculty. Lenning and Ebbers (1999) determined that "for all types of students, students in residence hall learning communities had significantly higher levels than did students in traditional residence halls on involvement, amount and quality of intellectual interaction with faculty and peers, integration of in-class and out-of-class information, and gains in both learning and intellectual development" (pp. 54-55).

Bureaucratic Environment

There is a strong relationship between the presidential and administrative styles within an educational institution and student outcomes (Astin & Scherrei, 1980; Berger, 2001-2002). "The bureaucratic presidential style is generally associated with student dissatisfaction over administrative services and procedures. Students attending colleges headed by bureaucratic presidents tend to be dissatisfied with the registration process, financial aid services, curriculum advisement, and the quality of housing on campus and to report that the institution was slow in responding to their requests for information during the application process" (Astin & Scherrei, 1980, p. 126).

Godwin and Markham (1996) studied how students perceived overly bureaucratic educational organizations, and found that students did not like the many lines and waiting, the impersonal staff, the rigid and contradictory rules, getting the "runaround" from staff, and they found the amount of paperwork to be annoying. Although many students felt that this type of organizational structure de-personalized the college experience (Astin & Scherrei, 1980), not all students were dissuaded by these types of organizations since some considered it an "expected part of the college experience" (Berger, 2001-2002, p. 11).

The more successful leadership styles are those that involve students and, although administrators may not have control over many of the characteristics of their organization, they are able to create a climate that has a positive impact on students (Astin & Scherrei, 1980; Stodt, 1987). "Administrators and their policies throughout the institution must show awareness of their impact on students, whether the staff function is collecting student data, tracking student progress, treating students courteously, or providing interventions when problems occur" if their intention is to increase retention (Stodt, 1987, p. 9).

Campus Political Views

"Highly politicized campus environments have negative effects on student satisfaction, which may lead to decreases in student persistence" (Berger, 2001-2002, pp. 12-13). More specifically, the more liberal political views as experienced by freshman students in their first semester has a statistically significant negative effect on perceptions of institutional support, spring faculty involvement, and spring peer involvement (Berger & Milem, 1999).

Financial Patterns and Student Outcomes

Tinto (1993) found that there were action principles necessary to be in place for successful retention programs and one of those principles was that "institutions should provide resources for program development and incentives for program participation that reach out to faculty and staff alike" (p. 149). Institutions need an intentional, campuswide policy of incentive programs that reward faculty and staff for the behaviors that are consistent with an institution's mission.

Gansemer-Topf (2004) studied private baccalaureate colleges and universities and found that the "amount of money spent per student in the areas of instruction, academic support, student services, institutional support and institutional grants significantly predicted first-year retention and 6-year graduation rates" (p. 164). These rates also were found to correlate positively with institutional selectivity.

In a 1995 study of 363 Carnegie Baccalaureate I and II institutions (which represented 58.2% of all Baccalaureate I and II institutions), Ryan (2004) found that expenditures at these institutions affected both student persistence and degree attainment. Ryan also found that academic support expenditures—including "academic administration and curriculum development, libraries, audio/visual services, and technology support for instruction"—as well as instructional expenditures and institutional size had positive, significant effects on graduation rates (p. 110). Additionally, it was found that student service expenditures did not appear to have a significant effect on degree attainment.

Hamrick, Schuh, and Shelley (2004) studied 444 public 4-year institutions to find if institutional characteristics and/or expenditure patterns had any impact on graduation rates. This study found that higher graduation rates were directly related to "strategically targeted

institutional budgetary enhancements" and that the best returns were found when the institutions allocated larger expenditures per student in the areas of instruction, library, the physical plant, and nonlibrary academic support. There were additional positive impacts on graduation rates, although not as strong, on the expenditures per student for student affairs and institutional support programs and, lagging further behind, was the effect on the expenditure per student from spending in education and general on graduation rates.

Another outcome was analyzed in a study of over 300 colleges and universities in an effort to analyze the impact of expenditure patterns on the development of students' leadership skills over a 4-year period. The findings of this study were that there was a significant negative correlation between expenditures for instruction and student leaders' development and there was a significant positive correlation between expenditures for student services and student leaders' development (Smart, Ethington, Riggs, & Thompson, 2002).

Theoretical and Conceptual Frameworks

This study was organized around both the theoretical framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence.

The "resource dependence theory is a theory of organization(s) that seeks to explain organizational and inter-organizational behavior in terms of those critical resources which an organization must have in order to survive and function" (Johnson, 1995, p. 1). This theory is political-economical in nature and focuses on how the organizations have an external constraint on resources and they are *dependent* on an outside entity for their survival. Additionally, this theory suggests that administrators need to develop strategies to address

their dependence on those externally-controlled resources. "Over time, power accrues to those organizational leaders and sub-units who prove adept at reducing the constraints, uncertainties, and contingencies which accompany the flow of critical resources" (Johnson, 1995, p. 12).

The second concept that this research was organized around is the organizational nature of student persistence. This concept, which is an elaboration of Tinto's interactionalist theory of student departure, contends that the organizational structure of an institution has an impact on student persistence. The term "organizational behavior" can be used to represent any actions of the "organizational agents (faculty, administrators, and staff) at a college or university" including their decision-making in the areas of resource allocation and expenditures patterns (Berger, 2001-2002, p. 4). Berger (2001-2002) concludes that colleges are organizations and, therefore, it is important to be aware of the organizational behavior since "the patterns of organizational behavior with them have important consequences for the retention of undergraduate students" (p. 19).

Thus, with the use of this theory and concept, the research was framed to show the impact of scarce resources on student persistence (i.e., retention rates). Using the resource dependence theory, it can be asserted that the existence of scarce resources impacts organizational behavior. Using the concept of the organizational nature of student persistence, it can be further asserted that the organizational behavior, which was a result of those scarce resources, has an impact on student retention rates.

Summary

This literature review was organized around both the theoretical framework of the resource dependence theory and the conceptual framework of the organizational nature of

student persistence. This literature review provided some background information on the history of community colleges, identified financial patterns of community college, and discussed the organizational behavior of community colleges in an effort to help frame the study around the theoretical framework of the resource dependence theory. It also discussed accountability and efficiency and reviewed research studies on student outcomes to additionally frame this study around the conceptual framework of the organizational nature of student persistence. This literature review should have provided a richer context and understanding of the research problem.

CHAPTER 3. METHODOLOGY

Overview

The purpose of this study was to understand the relationship between the public 2-year educational institutions' institutional characteristics and first-year retention rates within the framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence. It was the intended goal of this study to obtain an understanding of how an institution's characteristics and revenue and expenditure structures/patterns impact student retention rates in an effort to assist organizations in their configuration of resources to improve these rates.

Integrated Postsecondary Education Data System (IPEDS) provided the data for this study and multiple regression was used to analyze the data.

Hypotheses and Null Hypotheses

The hypothesis that was tested in this study was that a relationship exists between public 2-year educational institutions' institutional characteristics and first-year retention rates. The expected results for the individual research question in this study are as follows:

General Institutional Characteristics

1. In the 2003-2004 fiscal year, the general institutional characteristics of public 2-year institutions alone were able to predict first-year retention rates.
2. Between 1994-1995 and 2003-2004, the general institutional characteristics of public 2-year institutions were able to predict the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses.

3. Between 1994-1995 and 2003-2004, the general institutional characteristics of public 2-year institutions were able to predict the amount spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses.

Revenue Structure/Patterns

4. Between 1994-1995 and 2003-2004, the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions were able to predict the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses.
5. In the 2003-2004 fiscal year, the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions alone were able to predict first-year retention rates.
6. Between 1994-1995 and 2003-2004, the dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions were able to predict the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses.
7. In the 2003-2004 fiscal year, the dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions alone were able to predict first-year retention rates.

Expenditure Structure/Patterns

8. In the 2003-2004 fiscal year, the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses at public 2-year institutions alone were able to predict first-year retention rates.
9. In the 2003-2004 fiscal year, the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses at public 2-year institutions alone were able to predict first-year retention rates.

The null hypotheses would be the nonexistence of the relationships as represented in Figure 3. Additionally, due to the potential financial differences between Arts and Sciences-oriented institutions and Applied Sciences-oriented institutions, these institutions were analyzed separately from one another.

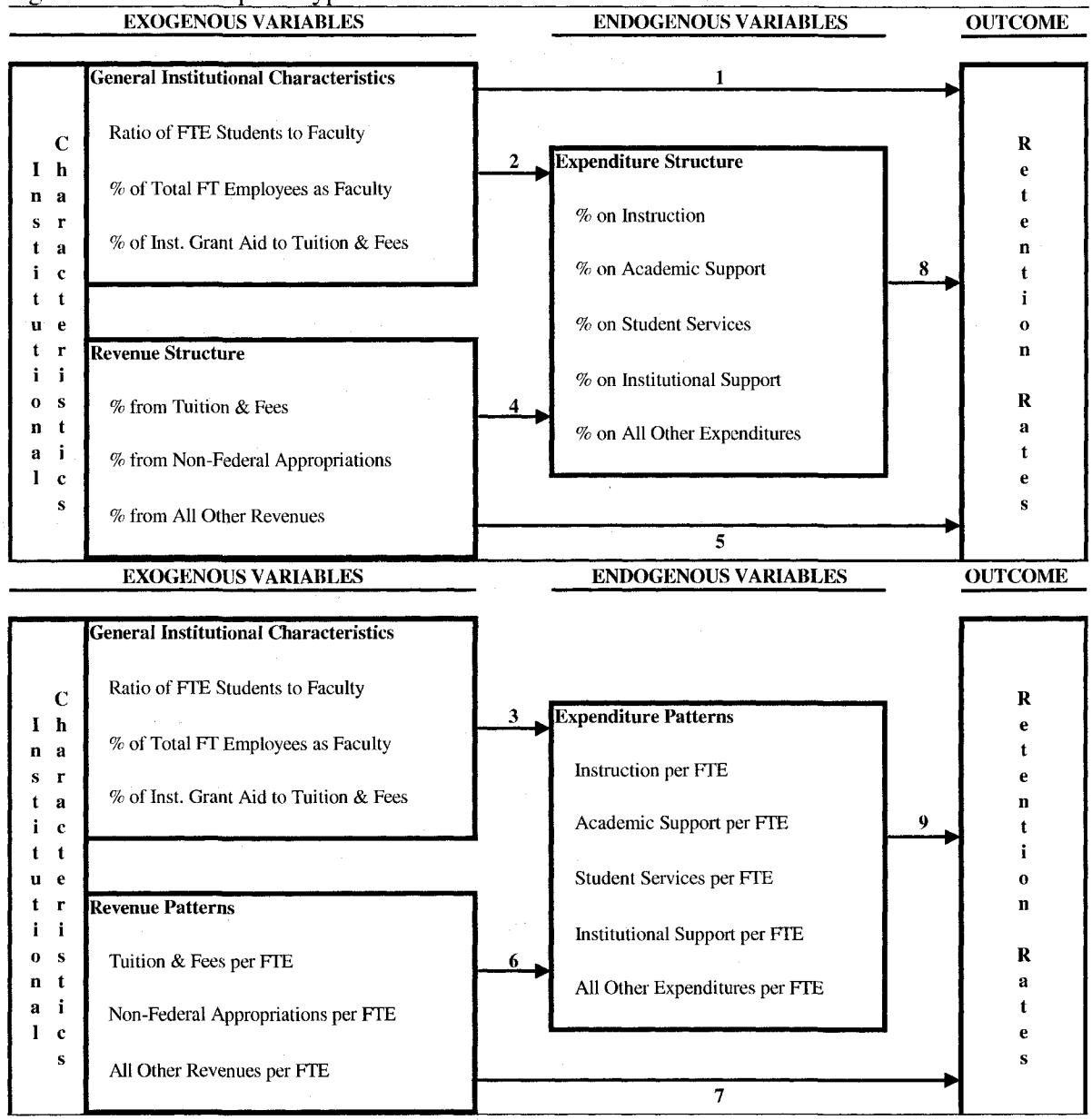
Research Design

This quantitative study sought to determine if retention rates can be predicted by either institutional characteristics, overall revenue structure/patterns, or overall expenditure structure/patterns for public 2-year institutions as identified by the 2000 Carnegie Classification system. The population of this study included 271 public 2-year institutions that represented 23.1% of the public 2-year institutions and enrolled approximately 7.6% of the students in public 2-year institutions in the United States in 2003-2004.

This study used empirical-analytical inquiry, which required that "procedures are systematic and public, precise definitions are used, objectivity-seeking methods for data

collection and analysis are used, and that findings are replicable" (Gage, 1994, p. 372). The researcher also used a deductive approach to test the hypotheses (Creswell, 2003).

Figure 3. Visual Map of Hypotheses



Data were collected through quantitative databases and there was no contact between the researcher and the institutions studied. Additionally, the data were analyzed using multiple regression analysis and standard statistical software. For these reasons, the data and

analysis of the data were considered to be objective and reliable and the role of the researcher was one of objective observation.

Sample and Population

Both cross-sectional and longitudinal secondary institutional data were collected using the Integrated Postsecondary Education Data System (IPEDS), which is an online database provided by the National Center for Education Statistics (NCES). "IPEDS is a single, comprehensive system designed to encompass all institutions and educational organization whose primary purpose is to provide postsecondary education" (NCES, 2005). NCES requires that all educational institutions report a variety of educational statistics through their mandatory reporting requirement.

The target population of this study consisted of 271 public 2-year institutions represented 23.1% of the public 2-year institutions and enrolled approximately 7.6% of the students in public 2-year institutions in the United States in 2003-2004. Public 2-year institutions (i.e., community colleges), in particular, were studied since, by definition, they were created as a response to and to be responsive to community needs. Additionally, since half of the students who begin college in the United States do so at a community college, increased retention rates could have a large impact on the educational population (Cohen & Brawer, 2003).

This study chose retention rates as the output measure since this is a measure frequently used to evaluate the efficiency and productivity of an institution (Burke, 1998b). An institution's retention rate is an important output measure because it is a measure of an institution's ability to retain the students who chose to attend the institution (Tinto, 1993).

Data Collection and Variables

The Consumer Price Indices (CPI's), used to standardize longitudinal monetary data, were collected from the US Department of Labor, Bureau of Labor Statistics. All remaining data, including cross-sectional and longitudinal secondary institutional data, were collected using the Integrated Postsecondary Education Data System (IPEDS). All data were considered to be both valid and reliable.

This study focused on institutional characteristics, institutional revenues, institutional expenditures, and first-year retention rates. Institutional characteristics were the ratio of FTE students to full-time faculty, the percentage of total full-time employees who are faculty, and institutional grant aid as a percentage of tuition and fee income. Institutional revenues were broken down into the three categories of tuition and fees, non-federal appropriations, and other sources or revenue. Institutional expenditures were broken down into the five categories of instruction, academic support, student services, institutional support, and other expenses. Additionally, both revenue and expenditures used variables that tested their overall structures (i.e., percentage of overall amounts) and their patterns (i.e., per FTE student). Longitudinal monetary data were standardized into 2003-2004 dollars using the Consumer Price Index (CPI). Data were analyzed in composite, for all institutions in the study, as well as looked at individually as Arts and Sciences-oriented institutions and Applied Sciences-oriented institutions. Table 7 presents the variables of this study and Appendix A shows provides a detailed description of those variables. Appendix B shows the breakdown of both total revenues and total expenditures for public 2-year institutions.

Table 7. Variables, Variable Codes, and Related Research Questions

Variables	Variable Codes	Research Questions
First-year retention rates	RETR	1, 5, 7, 8, 9
Ratio of full-time equivalent student to full-time faculty	CRSF	1, 2, 3
Percentage of total full-time employees who are faculty	CTEF	1, 2, 3
Institutional grant aid as a percentage of tuition and fees	CGTF	1, 2, 3
% from tuition and fees	RTF%	4, 5
% from non-federal government appropriations	RSL%	4, 5
% from other sources of revenue	ROS%	4, 5
% on instruction	EIN%	2, 4, 8
% on academic support	EAS%	2, 4, 8
% on student services	ESS%	2, 4, 8
% on institutional support	EIS%	2, 4, 8
% on other expenses	EOE%	2, 4, 8
Tuition and fees per student	RTFS	6, 7
Non-federal government appropriations per student	RSLS	6, 7
Other sources of revenue per student	ROSS	6, 7
Instruction per student	EINS	3, 6, 9
Academic support per student	EASS	3, 6, 9
Student services per student	ESSS	3, 6, 9
Institutional support per student	EISS	3, 6, 9
Other expenses per student	EOES	3, 6, 9

Revenues and expenditures were calculated both as a percentage of total revenues and expenditures as well as on per-student bases or, more specifically, per full-time equivalent (FTE) student. FTE is defined as "a measurement equal to one student enrolled full time for one academic year. Total FTE enrollment includes full time plus the calculated equivalent of

the part-time enrollment" (NCES, 2005). Appendix A includes a detailed description on the collection procedures of the IPEDS data for analysis in preparing the variables for analysis.

The nine research questions were tested and analyzed using multiple regression analysis as follows:

QUESTION 1:

In the 2003-2004 fiscal year, were the general institutional characteristics of public 2-year institutions alone able to predict first-year retention rates?

$RETR = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

where: β_0 = the y-intercept

$\beta_1, \beta_2, \beta_3$ = the corresponding effects

QUESTION 2:

Between 1994-1995 and 2003-2004, were the general institutional characteristics of public 2-year institutions able to predict the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses?

$EIN\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

$EAS\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

$ESS\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

$EIS\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

$EOE\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

where: β_0 = the y-intercept

$\beta_1, \beta_2, \beta_3$ = the corresponding effects

QUESTION 3:

Between 1994-1995 and 2003-2004, were the general institutional characteristics of public 2-year institutions able to predict the amount spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?

$EINS = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

$EASS = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

$ESSS = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

$EISS = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

$EOES = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$

where: β_0 = the y-intercept

$\beta_1, \beta_2, \beta_3$ = the corresponding effects

QUESTION 4:

Between 1994-1995 and 2003-2004, were the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions able to predict the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?

$EIN\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$

$EAS\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$

$ESS\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$

$EIS\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$

$EOE\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$

where: β_0 = the y-intercept

β_1, β_2, β_3 = the corresponding effects

QUESTION 5:

In the 2003-2004 fiscal year, were the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions alone able to predict first-year retention rates?

$RETR = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$

where: β_0 = the y-intercept

β_1, β_2, β_3 = the corresponding effects

QUESTION 6:

Between 1994-1995 and 2003-2004, were the dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions able to predict the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?

$EINS = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$

$EASS = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$

$ESSS = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$

$EISS = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$

$EOES = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$

where: β_0 = the y-intercept

β_1, β_2, β_3 = the corresponding effects

QUESTION 7:

In the 2003-2004 fiscal year, were the dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions alone able to predict first-year retention rates?

$RETR = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$

where: β_0 = the y-intercept

$\beta_1, \beta_2, \beta_3$ = the corresponding effects

QUESTION 8:

In the 2003-2004 fiscal year, were the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses at public 2-year institutions alone able to predict first-year retention rates?

$RETR = \beta_0 + \beta_1 EIN\% + \beta_2 EAS\% + \beta_3 ESS\% + \beta_4 EIS\% + \beta_5 EOE\%$

where: β_0 = the y-intercept

$\beta_1, \beta_{2...}\beta_5$ = the corresponding effects

QUESTION 9:

In the 2003-2004 fiscal year, were the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses at public 2-year institutions alone able to predict first-year retention rates?

$RETR = \beta_0 + \beta_1 EINS + \beta_2 EASS + \beta_3 ESSS + \beta_4 EISS + \beta_5 EOES$

where: β_0 = the y-intercept

$\beta_1, \beta_2 ... \beta_5$ = the corresponding effects

Longitudinal monetary data were standardized into 2003-2004 dollars using the Consumer Price Index (CPI). Data were analyzed in composite, for all institutions in the study, as well as looked at individually as Arts and Sciences-oriented institutions and Applied Sciences-oriented institutions. Results that could predict the dependent variable within an error of margin of ± 5% were considered to be valid and reliable as predictors.

Data Analysis

The relationship between the institutional characteristics, the overall revenue and expenditure structures/patterns, and retention rates were analyzed using descriptive and inferential statistics. Multiple regression analysis was used to examine if the independent variables of the institutional characteristics, overall revenue structure/patterns, and the overall expenditure structure/patterns were able to significantly predict either expenditure structure/patterns or retention rates with a level of significance (α) of .05. Any findings with an α level of .05 or below resulted in the null hypotheses being rejected. The software used for the trend analysis was Systat, version 11, and the software used for the multiple regression analysis was Statistical Package for Social Sciences (SPSS), version 12.0.

The data set was analyzed for missing data and outliers before the multiple regression analysis occurred. Data were transformed into z-scores and any values of ±4.00 or more extreme were considered to be outliers (Stevens, 1996). Those institutions with incomplete data and/or outliers were omitted so that the findings would not be distorted.

The variables were tested for multicollinearity, which indicates a high intercorrelation among the independent variables. The existence of multicollinearity could indicate a

potential problem because individual *p*-values could be distorted and it becomes difficult to isolate which indicators have the greatest impact (Motulsky, 2002). The variance-inflation factor (VIF) was used to measure potential multicollinearity with a VIF over 10 indicating a possible multicollinearity problem (Garson, 2006).

A standardized regression coefficient (ß) was estimated for the independent variables, which measured the amount of influence of that indicator on the dependent variable. Additionally, a *t*-test was conducted on each of the standardized regressions' coefficients for the independent variables using a level of significance of $p \leq .05$. The *t*-test helps the researcher to formulate the correct conclusions even when the distribution is fairly different from a normal distribution (Koosis, 1997).

The null hypotheses were tested both using the same methods as the hypotheses as well as with the *F*-test. The *F*-test was conducted with a level of significance of $p \leq .05$ to determine whether linear relationships exist between the independent and dependent variables.

Finally, the coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables. R^2 was used in the analysis of the research hypotheses: the greater the R^2, the stronger the relationship between those variables.

Summary

This quantitative study was conducted on the bases of the theoretical framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence to obtain an understanding of how the institutional characteristics impact student retention rates at public 2-year institutions. The data for all of the variables were

provided by the IPEDS and multiple regression analysis was used to analyze the data. The intended goal of this study was to obtain an understanding of how an institution's characteristics and revenue and expenditure structures/patterns impact student retention rates in an effort to assist organizations in their configuration of resources to improve these rates.

CHAPTER 4. RESULTS AND DISCUSSION

Overview

The purpose of this study was to understand the relationship between the public 2-year educational institutions' institutional characteristics and first-year retention rates within the frameworks of the resource dependence theory and the conceptual framework of the organizational nature of student persistence. It was the intended goal of this study to obtain an understanding of how an institution's characteristics and revenue and expenditure structures/patterns impact student retention rates in an effort to assist organizations in their configuration of resources to improve these rates.

IPEDS provided the data for this study and multiple regression was used to analyze the data.

General Institutional Characteristics

The first three research questions focused on the relationship between the general institutional characteristics of (1) the ratio of FTE students to faculty, (2) the percentage of total full-time employees as faculty, and (3) institutional grant aid as a percentage of tuition and fee income may impact retention rates and the expenditure structure and/or the expenditure patterns of a public 2-year institution. The first research question focused on whether the general institutional characteristics were able to predict first-year retention rates. The null hypothesis stated that these characteristics would not affect retention rates. The second research question focused on whether the general institutional characteristics were able to predict the expenditure structure. The null hypothesis stated that these characteristics would not affect the expenditure structure. The third research question focused on whether

the general institutional characteristics were able to predict the expenditure patterns. The null hypothesis stated that these characteristics would not affect the expenditure patterns.

Trend Analysis of General Institutional Characteristics

Before analyzing the research questions, the variables within the general institutional characteristics were analyzed and compared by state as well as educational orientation (i.e., Arts and Sciences-oriented or Applied Sciences-oriented). Educational orientation was determined by the number of associate's degrees awarded in the 2003-2004 academic year. Institutions with more than 50% of their degrees awarded in Arts and Sciences were considered to be Arts and Sciences-oriented while institutions with more than 50% of their degrees awarded in Applied Sciences were considered to be Applied Sciences-oriented.

Ratio of Full-Time Equivalent Students to Faculty (CRSF)

NCES (2005) considers full-time equivalent (FTE) students to be "equal to one student enrolled full time for one academic year." Full-time faculty are considered by NCES (2005) to be "those members of the instruction/research staff who are employed full time and whose major regular assignment is instruction" including those who may have release time for research or those for whom it is difficult to separate their instructional time from their other functions.

The overall mean of the ratio of FTE students to faculty by state ranged from 14.60 in South Dakota to 40.80 in Illinois (see rightmost column, Table 8). The weighted mean by year ranged from 28.29 to 33.21 with a 17.1% increase in the ratio of FTE students to faculty over the 10-year period (see bottom row, Table 8).

Table 8. Mean Ratio of Full-Time Equivalent Students to Faculty by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
IL	49	37.75		39.83		39.59		40.41	41.97	42.31	43.71	40.80
MI	31	32.76		32.72		32.37		33.65	36.63	37.63	38.62	34.91
MO	24	31.26		30.12		30.87		33.32	35.82	38.14	36.18	33.67
OH	38	28.95		28.95		29.84		33.21	29.81	33.95	32.50	31.03
IN	16	25.42		25.08		25.69		33.94	21.44	36.33	37.00	29.27
KS	29	28.03		27.06		24.43		25.32	26.11	25.48	28.10	26.36
IA	16	23.19		24.78		25.39		26.46	23.83	29.03	27.70	25.77
MN	30	25.40		21.35		22.00		23.92		29.55		24.44
NE	8	21.70		21.42		23.49		23.17	27.86	25.82	22.89	23.76
ND	7	18.10		18.86		20.27		17.00	18.08	21.59	20.83	19.25
WI	18	15.83		15.42		15.87		16.40	21.53	17.71	17.32	17.15
SD	5	6.15		14.75		17.70		17.38	13.94	18.25	14.05	14.60
Weighted Mean		28.36		28.29		28.44		30.22	31.01	32.78	33.21	

The mean of FTE students to faculty was 34.24 for Arts and Sciences-oriented institutions and 29.91 for Applied Sciences-oriented institutions, a 14.5% difference (see rightmost column, Table 9).

Table 9. Mean Ratio of Full-Time Equivalent Students to Faculty by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
A&S	67	32.14		31.70		31.21		32.88	37.08	36.13	38.54	34.24
AS	204	27.56		27.04		27.55		29.05	32.57	31.33	34.26	29.91

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Illinois was significantly different from other states; Iowa, Kansas, Minnesota, and Nebraska were not significantly different from each other, but each was significantly different from Indiana, Michigan, Missouri, North Dakota, Ohio, South Dakota, and Wisconsin. Additionally, the following groups of states were not significantly different from each other although these groups were significantly different from one another: Indiana and Ohio, Michigan and Missouri, and North Dakota, South Dakota, and Wisconsin (see Table 10).

Table 10. Tukey Test Results for the Ratio of Full-Time Equivalent Students to Faculty by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.000	1.000										
IN	0.042	0.000	1.000									
KS	1.000	0.000	0.044	1.000								
MI	0.000	0.000	0.120	0.000	1.000							
MN	0.997	0.000	0.000	0.922	0.000	1.000						
MO	0.000	0.000	0.529	0.000	1.000	0.000	1.000					
ND	0.026	0.000	0.000	0.005	0.000	0.143	0.000	1.000				
NE	0.982	0.000	0.004	0.891	0.000	1.000	0.000	0.671	1.000			
OH	0.001	0.000	1.000	0.001	0.055	0.000	0.487	0.000	0.000	1.000		
SD	0.001	0.000	0.000	0.000	0.000	0.007	0.000	0.989	0.100	0.000	1.000	
WI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.950	0.002	0.000	1.000	1.000

Percentage of Full-Time Employees Who Are Faculty (CTEF)

NCES (2005) considers full-time employees to be those whose "type of appointment at the snapshot date" indicates that they are full-time. Full-time faculty are considered by NCES (2005) to be "those members of instruction/research staff who are employed full time and whose major regular assignment is instruction" including those who may have release time for research or those for whom it is difficult to separate their instructional time from their other functions.

The mean percentage of full-time employees who are faculty ranged from 35.2% in Illinois to 53.5% in South Dakota (see rightmost column, Table 11). The weighted mean by year ranged from 36.8% to 42.4% with a 12.3% decrease in the percentage of full-time employees as faculty over the 10-year period (see bottom row, Table 11).

The mean percentage of full-time employees who are faculty was 39.9% for Applied Sciences-oriented institutions and 37.6% for Arts and Sciences-oriented institutions, a 6.1% difference (see rightmost column, Table 12).

Table 11. Mean % of Full-Time Employees Who Are Faculty by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
SD	5	56.0		56.3		57.0		48.8	51.3	47.8	57.2	53.5
MN	30	52.5		52.5		49.7		49.4		43.4		49.5
WI	18	48.6		47.3		45.3		43.7	39.2	44.1	42.8	44.4
OH	38	43.4		42.8		41.8		38.8	39.1	41.0	38.4	40.8
KS	29	41.5		41.0		39.4		40.3	39.2	41.4	37.6	40.0
NE	8	43.8		44.0		38.9		37.5	37.5	37.9	39.8	39.9
IN	16	42.0		40.6		39.5		37.3	33.4	38.9	40.8	38.9
IA	16	39.2		38.5		38.4		36.6	37.6	38.4	36.6	37.9
ND	7	35.6		40.4		37.7		38.0	44.5	36.5	31.7	37.8
MO	24	39.2		39.3		38.4		37.8	35.4	34.8	34.7	37.1
MI	31	39.2		37.9		36.8		35.5	33.7	35.1	35.2	36.2
IL	49	38.0		36.6		35.9		34.4	33.7	33.9	33.6	35.2
Weighted Mean		42.4		41.8		40.5		39.1	36.8	38.6	37.2	

Table 12. Mean % of Full-Time Employees Who Are Faculty by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	42.8		42.6		41.2		39.5	36.6	39.4	37.5	39.9
A&S	67	40.0		40.3		38.8		38.4	35.3	36.5	34.0	37.6

Using the Tukey HSD procedure, Illinois, Minnesota, South Dakota, and Wisconsin were significantly different from each other and other states, and Iowa, Indiana, Michigan, Missouri, North Dakota, and Nebraska were not significantly different from each other but were significantly different from Kansas and Ohio. Additionally, Kansas and Ohio were not significantly different from one another (see Table 13).

Table 13. Tukey Test Results for the Percentage of Full-Time Employees Who Are Faculty by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.051	1.000										
IN	0.944	0.000	1.000									
KS	0.575	0.000	1.000	1.000								
MI	0.958	0.627	0.084	0.002	1.000							
MN	0.000	0.000	0.000	0.000	0.000	1.000						
MO	1.000	0.321	0.404	0.047	1.000	0.000	1.000					
ND	1.000	0.826	0.942	0.729	1.000	0.000	1.000	1.000				
NE	0.964	0.003	1.000	1.000	0.252	0.000	0.600	0.950	1.000			
OH	0.048	0.000	0.937	0.990	0.000	0.000	0.000	0.222	0.997	1.000		
SD	0.000	0.000	0.000	0.000	0.000	0.681	0.000	0.000	0.000	0.000	1.000	
WI	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.003	0.001	0.002	1.000

Institutional Grant Aid as a Percentage of Tuition and Fee Income (CGTF)

NCES (2005) considers grant aid to be "expenditures for scholarships and fellowships received from private sources (e.g., businesses, foundations, individuals, foreign governments) that used restricted-expendable net assets of the institution as well as scholarships and fellowships from unrestricted net assets of the institution."

The mean percentage of institutional grant aid to tuition and fee income ranged from 74.2% in Nebraska to 30.7% in Ohio (see rightmost column, Table 14). The weighted mean by year ranged from 41.2% to 55.5% with an 18.1% decrease in the percentage of institutional grant aid over tuition and fee income over the 10-year period (see bottom row, Table 14).

Table 14. Mean % of Institutional Grant Aid to Tuition and Fee Income by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
NE	8	70.9		90.1		83.4		76.3		57.2	67.1	74.2
IN	16	70.4		65.5		70.4		69.4		63.0	69.1	68.0
KS	29	71.3		64.9		69.0		76.0		33.3	54.3	61.5
IL	49	47.6		49.5		53.3		55.5		69.5	82.1	59.6
MO	24	56.8		56.3		64.0		68.5		44.8	48.1	56.4
ND	7	70.0		44.1		79.5		67.4		52.3	8.6	53.7
SD	5	96.3		42.9		51.7		76.1		10.3	24.4	50.3
MN	30	41.0		44.8		49.6		51.5		31.6		43.7
MI	31	47.7		44.2		46.9		51.4		28.2	27.2	40.9
WI	18	40.5		35.4		37.6		45.3		36.4	36.6	38.6
IA	16	38.6		32.7		34.9		36.2		30.6	13.1	31.0
OH	38	34.0		31.0		34.6		35.8		22.8	26.1	30.7
Weighted Mean		50.8		48.0		52.6		55.5		41.2	41.6	

The mean percentage of institutional grant aid to tuition and fee income was 50.9% for Applied Sciences-oriented institutions and 49.0% for Arts and Sciences-oriented institutions, a 3.9% difference (see rightmost column, Table 15).

Table 15. Mean % of Institutional Grant Aid to Tuition and Fee Income by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	50.6		47.8		49.3		53.6		41.9	62.0	50.9
A&S	67	45.9		45.8		57.5		57.8		42.6	44.2	49.0

Using the Tukey HSD procedure, with the exception of Illinois, none of the states were significantly different from one another. Illinois was not significantly different from Indiana, Kansas, Missouri, North Dakota, Nebraska, and South Dakota (see Table 16).

Table 16. Tukey Test Results for the Percentage of Institutional Grant Aid to Tuition and Fee Income by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.533	1.000										
IN	0.999	0.991	1.000									
KS	1.000	0.960	1.000	1.000								
MI	1.000	0.406	1.000	1.000	1.000							
MN	1.000	0.526	1.000	1.000	1.000	1.000						
MO	1.000	0.967	1.000	1.000	1.000	1.000	1.000					
ND	0.905	1.000	0.998	0.995	0.932	0.945	0.993	1.000				
NE	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
OH	1.000	0.115	0.996	0.997	1.000	1.000	1.000	0.833	0.999	1.000		
SD	1.000	0.998	1.000	1.000	1.000	1.000	1.000	0.998	1.000	1.000	1.000	
WI	1.000	0.578	1.000	1.000	1.000	1.000	1.000	0.931	1.000	1.000	1.000	1.000

Multiple Regression Analysis of General Institutional Characteristics

Research Questions 1 through 3 were addressed by analyzing relationships between general institutional characteristics of public 2-year institutions and retention rates, expenditure structure, and expenditure patterns.

Research Question 1

For Research Question 1, regression analysis was used to ascertain whether in the 2003-2004 fiscal year the general institutional characteristics of public 2-year institutions alone were able to predict first-year retention rates. The null hypothesis was that these characteristics were not able to predict first-year retention rates.

The data for first-year retention rates (RETR), the ratio of FTE student to full-time faculty (CRSF), the percentage of total full-time employees who are faculty (CTEF), and

institutional grant aid as a percentage of tuition and fee income (CGTF) were gathered and the data set was analyzed for missing data and outliers before the multiple regression analysis occurred. The following equation was tested:

$$RETR = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The model was checked for multicollinearity, which indicates a high intercorrelation between the independent variables. With VIFs ranging from 1.004 to 1.320, multicollinearity was not considered to be a problem.

A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C). Next, a *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using Type I error level of $\alpha \leq .05$. When the *t*-test was conducted, it was found that the null hypothesis could not be rejected. Additionally, the *F*-test was conducted with Type I error level $\alpha = .05$ determined the level of linearity between the independent and dependent variables. When the *F*-test was conducted, it also was found that the null hypothesis could not be rejected. Thus, it appears that in the 2003-2004 fiscal year, the general institutional characteristics of public 2-year institutions alone could not be determined to predict first-year retention rates.

When the questions again were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institutions, it was also found that in the 2003-2004 fiscal year,

the general institutional characteristics of public 2-year institutions alone could not be determined to predict first-year retention rates for the individual types of institutions.

Overall, no relationship could be determined between the general institutional characteristics and first-year retention rates for public 2-year institutions in general or specifically for Arts and Sciences-oriented or Applied Sciences-oriented institutions.

Research Question 2

Research Question 2 used regression analysis to ascertain whether between 1994-1995 and 2003-2004 the general institutional characteristics of public 2-year institutions were able to predict the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses. The null hypothesis was that these characteristics were not able to predict any of the dollar amounts spent as a percentage of total funding.

Variables measuring the percentages spent on instruction (EIN%), academic support (EAS%), student services (ESS%), institutional support (EIS%), and other expenses (EOE%), the ratio of FTE students to full-time faculty (CRSF), the percentage of total full-time employees who are faculty (CTEF), and institutional grant aid as a percentage of tuition and fee income (CGTF) were assessed for missing data and outliers prior to multiple regression analysis. In Research Question 2, each of the variables within the expenditure structure was tested individually as the dependent variables, resulting in the following equations being tested:

$$EIN\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

$$EAS\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

$$ESS\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

$$EIS\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

$$EOE\% = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The variables were tested for multicollinearity, which indicates a high intercorrelation between the independent variables. With VIFs ranging from 1.003 to 1.335, multicollinearity was not considered to be a problem.

Percentage of Total Expenditures Spent on Instruction. A standardized regression coefficient was determined for the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C), resulting in the following equation:

$$EIN\% = .324 - .001CRSF + .321CTEF - .033CGTF$$

In other words, the ratio of FTE student to full-time faculty and institutional grant aid as a percentage of tuition and fee income have negative effects on the percentage of total expenditures spent on instruction and the percentage of total full-time employees who are faculty has a positive effect.

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of no linearity between the independent and dependent variables could be

rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .216.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EIN\% = .456 - .001CRSF - .069CGTF \qquad R^2 = .134$$

Applied Sciences-Oriented

$$EIN\% = .300 - .002CRSF + .383CTEF - .024CGTF \qquad R^2 = .250$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, negative relationships were found between the ratio of FTE student to full-time faculty and institutional grant aid as a percentage of tuition and fee income and the percentage of total expenditures spent on instruction and positive relationships between the percentage of total full-time employees who are faculty and the percentage of total expenditures spent on instruction. Variables that had no effect on the equations were removed.

Percentage of Total Expenditures Spent on Academic Support. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C). Next, a *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using Type I error level of $\alpha \leq .05$. When the *t*-test was conducted, it was found that the null hypothesis could not be rejected. Additionally, the *F*-test was conducted with Type I error level $\alpha \leq .05$ determined the level of linearity between the independent and dependent variables. When the *F*-test was conducted, it also was found that the null hypothesis could not be rejected. Thus, it appears that in the 2003-2004 fiscal year, the general institutional

characteristics of public 2-year institutions alone could not be determined to predict percentage of total expenditures spent on academic support.

Yet, when the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationship was found:

Arts and Sciences-Oriented

$$EAS\% = .050 + .082CTEF - .014CGTF \qquad R^2 = .045$$

For Arts and Sciences-oriented institutions, a positive relationship was found between the percentage of total full-time employees who are faculty and the percentage spent on academic support and a negative relationship from institutional grant aid as a percentage of tuition and fee income. Variables that had no effect on the equations were removed and no relationships were found for Applied Sciences-oriented institutions.

Percentage of Total Expenditures Spent on Student Services. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C). Next, a *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using Type I error level of $\alpha \leq .05$. When the *t*-test was conducted, it was found that the null hypothesis could not be rejected. Additionally, the *F*-test was conducted with Type I error level $\alpha \leq .05$ determined the level of linearity between the independent and dependent variables. When the *F*-test was conducted, it also was found that the null hypothesis could not be rejected. Thus, it appears that in the 2003-2004 fiscal year, the general institutional characteristics of public 2-year institutions alone could not be determined to predict percentage of total expenditures spent on student services.

Yet, when the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationship was found:

Arts and Sciences-Oriented

$$ESS\% = .058 + .078CTEF \qquad R^2 = .031$$

The percentage of total full-time employees who are faculty had a positive effect on the percentage spent on student services for Arts and Sciences-oriented institutions. Variables that had no effect on the equations were removed and no relationships were found for Applied Sciences-oriented institutions.

Percentage of Total Expenditures Spent on Institutional Support. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EIS\% = .146 + .001CRSF - .098CTEF$$

In other words, the ratio of FTE student to full-time faculty has a slightly positive effect on the percentage of total expenditures spent on instruction and the percentage of total full-time employees who are faculty has a negative effect. (CGTF was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .100.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$EIS\% = .145 + .001CRSF - .094CTEF$ $R^2 = .074$

Applied Sciences-Oriented

$EIS\% = .146 + .001CRSF - .100CTEF$ $R^2 = .108$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, the ratio of FTE student to full-time faculty has a slightly positive effect on the percentage of total expenditures spent on instruction and the percentage of total full-time employees who are faculty has a negative effect. Variables that had no effect on the equations were removed.

Percentage of Total Expenditures Spent on Other Expenses. A standardized regression coefficient was determined for the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EOE\% = .394 - .245CTEF + .040CGTF$$

In other words, the percentage of total full-time employees who are faculty has a negative effect on the percentage of total expenditures spent on other expenses and institutional grant aid as a percentage of tuition and fee income had a positive effect. (CRSF was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected.

The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .120.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EOE\% = .355 - .165CTEF + .067CGTF \qquad R^2 = .180$$

Applied Sciences-Oriented

$$EOE\% = .403 - .264CTEF + .033CGTF \qquad R^2 = .111$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, negative relationships were found between the percentage of total full-time employees who are faculty and the percentage of total expenditures spent on other expenses and positive relationships between institutional grant aid as a percentage of tuition and fee income and the percentage of total expenditures spent on other expenses. Variables that had no effect on the equations were removed.

Research Question 3

Research Question 3 used regression analysis to ascertain whether between 1994-1995 and 2003-2004 the general institutional characteristics of public 2-year institutions were able to predict the amount spent per student for instruction, academic support, student services, institutional support, and all other expenses. The null hypothesis was that these characteristics were not able to predict any of the dollar amounts spent per student.

The data for the variables of the amounts spent per student for instruction (EINS), academic support (EASS), student services (ESSS), institutional support (EISS), other expenses (EOES), and the ratio of FTE student to full-time faculty (CRSF), the percentage of

total full-time employees who are faculty (CTEF), and institutional grant aid as a percentage of tuition and fee income (CGTF) were gathered and the data set was analyzed for missing data and outliers before the multiple regression model was estimated. In Research Question 3, each of the variables within the expenditure patterns was tested individually as dependent variables, resulting in the following equations being tested:

$$EINS = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

$$EASS = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

$$ESSS = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

$$EISS = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

$$EOES = \beta_0 + \beta_1 CRSF + \beta_2 CTEF + \beta_3 CGTF$$

Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The variables were tested for multicollinearity, which indicates a high intercorrelation between the independent variables. With VIFs ranging from 1.000 to 1.453, multicollinearity was not considered to be a problem.

Amount Spent on Instruction per Student. A standardized regression coefficient (ß) was determined for the independent variables, which measured the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EINS = 7{,}459.573 - 93.954CRSF - 472.496CGTF$$

In other words, both the ratio of FTE students to full-time faculty and institutional grant aid as a percentage of tuition and fee income appear to have negative effects on the amount spent on instruction per student. (CTEF was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .377.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EINS = 7{,}119.758 - 64.062CRSF - 2{,}517.476CTEF - 542.357CGTF \qquad R^2 = .286$$

Applied Sciences-Oriented

$$EINS = 7{,}735.169 - 100.891CRSF - 385.089CTEF \qquad R^2 = .388$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, all of the institutional characteristics had negative effects on the amount spent on instruction per student with the exception of the percentage of total full-time employees who are faculty which had no effect on Applied Sciences-oriented institutions.

Amount Spent on Academic Support per Student. A standardized regression coefficient (ß) was determined for the independent variables, which measured the amount of

influence of that indicator on the dependent variables (see Appendix C), resulting in the following equation:

$$EASS = 1{,}210.603 - 7.531CRSF - 508.817CTEF$$

In other words, both the ratio of FTE students to full-time faculty and the percentage of total full-time employees who are faculty appear to have negative effects on the amount spent on academic support per student. (CTEF was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .023.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EASS = 1{,}030.947 - 8.007CRSF \qquad R^2 = .026$$

Applied Sciences-Oriented

$$EASS = 1{,}329.120 - 7.886CRSF - 773.556CTEF \qquad R^2 = .027$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, the ratio of FTE students to full-time faculty has a negative effect on the amount spent on academic support per student. The percentage of total full-time employees who are faculty was also found to have a negative effect on the amount spent on academic support per student for

Applied Sciences-oriented institutions. Variables that had no effect on the equations were removed.

Amount Spent on Student Services per Student. A standardized regression coefficient (ß) was determined for the independent variables, which measured the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$ESSS = 1{,}722.993 - 13.797CRSF - 845.689CTEF$$

In other words, both the ratio of FTE students to full-time faculty and the percentage of total full-time employees who are faculty appear to have negative effects on the amount spent on student services per student. (CGTF was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .075.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$ESSS = 1{,}316.573 - 12.885CRSF$ $\qquad R^2 = .094$

Applied Sciences-Oriented

$ESSS = 1{,}919.254 - 13.634CRSF - 1{,}185.883CTEF - 92.346CTEF$ $\qquad R^2 = .081$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, all of the institutional characteristics had negative effects on the amount spent on instruction per student with the exception of the percentage of total full-time employees who are faculty and institutional grant aid as a percentage of tuition and fee income which had no effect on Arts and Sciences-oriented institutions.

Amount Spent on Institutional Support per Student. A standardized regression coefficient (ß) was determined for the independent variables, which measured the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EISS = 2{,}968.272 - 14.591CRSF - 2{,}626.640CTEF$$

In other words, the ratio of FTE students to full-time faculty and the percentage of total full-time employees who are faculty both appear to have negative effects on the amount spent on institutional support per student. (CGTF was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .089.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$EISS = 2{,}023.734 - 1{,}892.530CTEF + 231.292CGTF$ $R^2 = .067$

Applied Sciences-Oriented

$EISS = 3{,}073.106 - 15.966CRSF - 2{,}737.058CTEF$ $R^2 = .104$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, all of the institutional characteristics had negative effects on the amount spent on instruction per student with the exceptions of the ratio of FTE student to full-time faculty which had no effect on Arts and Sciences-oriented institutions and institutional grant aid as a percentage of tuition and fee income which had no effect on Applied Sciences-oriented institutions.

Amount Spent on Other Expenses per Student. A standardized regression coefficient (ß) was determined for the independent variables, which measured the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EOES = 7{,}372.063 - 55.535CRSF - 6{,}052.382CTEF + 421.005CGTF$$

In other words, both the ratio of FTE students to full-time faculty and the percentage of total full-time employees who are faculty appear to have negative effects on the amount spent on instruction per student. Institutional grant aid as a percentage of tuition and fee income had a positive effect on the amount spent on instruction per student.

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected.

The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .236.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EOES = 5{,}982.048 - 43.095CRSF - 4{,}566.201CTEF + 1{,}072.307CGTF \quad R^2 = .376$$

Applied Sciences-Oriented

$$EOES = 7{,}599.993 - 55.396CRSF - 6{,}384.637CTEF + 280.799CGTF \quad R^2 = .214$$

For Arts and Sciences-oriented and Applied Sciences-oriented institutions, both the ratio of FTE students to full-time faculty and the percentage of total full-time employees who are faculty appear to have negative effects on the amount spent on other expenses per student. Institutional grant aid as a percentage of tuition and fee income had a positive effect on the amount spent on instruction per student for both types of institutions.

Revenue Structure/Patterns

The next two research questions (Research Questions 4 and 5) focused on the relationship between the revenue structure of (1) the percentage of total revenue received from tuition and fees, (2) the percentage of total revenue received from non-federal appropriations, and (3) the percentage of total revenue received from all other revenues and the expenditure structure and/or the first-year retention rates of a public 2-year institution. The following two research questions (Research Questions 6 and 7) focused on the relationship between the revenue patterns of (1) tuition and fees received per student, (2) non-federal appropriations per student, and (3) all other revenues per student and the expenditure patterns and/or the first-year retention rates of a public 2-year institution.

Research Question 4 focused on whether the revenue structure was able to predict the expenditure structure. The null hypothesis stated that the revenue structure would not affect the expenditure structure. Research Question 5 focused on whether the revenue structure was able to predict the first-year retention rates. The null hypothesis stated that the revenue structure would not affect the retention rates. Research Question 6 focused on whether the revenue patterns were able to predict the expenditure patterns. The null hypothesis stated that the revenue patterns would not affect the expenditure patterns. Research Question 7 focused on whether the revenue patterns were able to predict the first-year retention rates. The null hypothesis stated that the revenue patterns would not affect the retention rates.

Trend Analysis of Revenue Structure/Patterns

Before analyzing the research questions, the variables within the revenue structure/patterns were analyzed and compared by state as well as educational orientation (i.e., Arts and Sciences-oriented or Applied Sciences-oriented). Educational orientation was determined by the number of associate's degrees awarded in the 2003-2004 academic year. Institutions with more than 50% of their degrees awarded in Arts and Sciences were considered to be Arts and Sciences-oriented while institutions with more than 50% of their degrees awarded in Applied Sciences were considered to be Applied Sciences-oriented.

Percentage of Total Revenue Received from Tuition and Fees (RTF%)

NCES (2005) considers tuition and fees to be "revenues from all tuition and fees assessed against students (net of refunds and discounts and allowances) for educational purposes."

The overall mean of the percentage of total revenue received from tuition and fees by state ranged from 14.1% in Wisconsin to 34.1% in Ohio (see rightmost column, Table 17).

The weighted mean by year ranged from 18.2% to 24.5% with an 11.2% decrease in the percentage of total revenue received from tuition and fees over the 10-year period (see bottom row, Table 17).

Table 17. Mean % of Total Revenue Received from Tuition and Fees by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
OH	38	37.3	36.2	36.8	36.6	36.2	34.1	33.0	27.3	30.6	32.4	34.1
SD	5	29.1		30.0	23.9	27.1	28.7	29.4	27.6	30.6	31.6	28.7
MN	30	24.9	26.6	25.6	25.6	24.8	26.2	26.1		27.1	29.2	26.2
IN	16	25.0	24.5	43.0	26.4	26.2	23.5	24.2	23.0	22.2	23.4	26.1
IA	16	22.9	23.7	25.1	24.1	23.7	23.7	23.7		18.8	19.6	22.8
MO	24	24.8	23.3	23.2	21.7	20.4	20.9	21.2	19.0	22.7	20.8	21.8
MI	31	23.0	23.8	23.7	22.0	22.1	21.1	20.7	17.9	16.0	17.1	20.7
ND	7	21.8	22.5	27.5	21.4	20.6	20.2	18.2	17.5	17.1	19.2	20.6
IL	49	18.7	18.7	18.7	18.2	17.8	18.3	17.9	12.9	14.2	12.7	16.8
KS	29	17.1	15.5	15.8	15.9	15.7	16.0	16.1	15.1	15.7	183	16.1
NE	8	15.2	15.5	15.3	15.5	15.4	15.7	15.9	13.1	14.3	13.2	14.9
WI	18	14.3	14.2	14.6	15.3	15.2	15.3	15.1	13.2	11.0	12.9	14.1
Weighted Mean		23.3	23.1	24.5	22.8	22.5	22.3	22.1	18.2	20.0	20.7	

The mean of the percentage of total revenue received from tuition and fees by educational orientation was 22.4% for Applied Sciences-oriented institutions and 21.9% for Arts and Sciences-oriented institutions, a 2.3% difference (see rightmost column, Table 18).

Table 18. Mean % of Total Revenue Received from Tuition and Fees by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	23.4	23.1	24.9	23.0	22.9	22.5	22.0	21.6	20.0	20.5	22.4
A&S	67	22.8	23.0	23.6	22.2	21.8	22.0	22.4	21.0	20.1	20.5	21.9

Tests of main effects for the state and year factors were conducted using analysis of variances and the Tukey HSD multiple comparison procedure. Ohio and South Dakota were significantly different from other states; Michigan, Missouri, and North Dakota were not significantly different from each other, but each was significantly different from the following groups of states that were not significantly different from each other although these groups were significantly different from one another: Illinois and Kansas, Indiana and

Minnesota, and Nebraska and Wisconsin. Also, Iowa was not significantly different from Missouri although it was significantly different from Michigan and North Dakota. Additionally, Kansas was not significantly different from Nebraska although it was significantly different from Wisconsin (see Table 19).

Table 19. Tukey Test Results for the % of Total Revenue Received from Tuition and Fees by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.000	1.000										
IN	0.005	0.000	1.000									
KS	0.000	0.982	0.000	1.000								
MI	0.378	0.000	0.000	0.000	1.000							
MN	0.000	0.000	1.000	0.000	0.000	1.000						
MO	0.998	0.000	0.000	0.000	0.986	0.000	1.000					
ND	0.545	0.040	0.000	0.006	1.000	0.000	0.963	1.000				
NE	0.000	0.598	0.000	0.986	0.000	0.000	0.000	0.002	1.000			
OH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000		
SD	0.000	0.000	0.725	0.000	0.000	0.758	0.000	0.000	0.000	0.000	1.000	
WI	0.000	0.001	0.000	0.162	0.000	0.000	0.000	0.000	1.000	0.000	0.000	1.000

Percentage of Total Revenue Received from Non-Federal Appropriations (RSL%)

NCES (2005) considers state appropriation to be "amounts received by the institution through acts of a state legislative body, except grants and contracts and capital appropriations" and local appropriations to be "government appropriations made by a governmental entity below the state level."

The overall mean of the percentage of total revenue received from non-federal government appropriations by state ranged from 16.6% in South Dakota to 63.4% in Wisconsin (see rightmost column, Table 20). The weighted mean by year ranged from 42.0% to 47.9% with a 5.8% decrease in the percentage of total revenue received from non-federal government appropriations over the 10-year period (see bottom row, Table 20).

Table 20. Mean % of Total Revenue Received from Non-Federal Government Appropriations by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
WI	18	65.0	65.9	62.3	65.5	65.2	60.9	61.0	63.8	64.3	60.5	63.4
NE	8	53.1	52.7	52.4	56.5	55.5	56.7	56.2	58.9	56.9	49.7	54.9
KS	29	53.2	55.6	54.0	56.6	55.8	54.8	54.2	29.7	55.3	48.5	51.8
MI	31	46.8	46.1	48.0	49.8	50.8	47.5	47.1	55.7	52.0	49.3	49.3
IL	49	50.1	28.4	43.7	50.9	50.9	46.2	45.2	46.0	46.1	42.8	45.0
MN	30	39.0	44..6	45.4	47.9	49.1	45.6	45.6		44.5	40.9	44.7
OH	38	39.7	40.8	41.2	44..4	44.0	42.7	41.8	36.7	35.3	34.4	40.1
IN	16	40.3	43.0		39.1	38.2	40.0	39.0	38.0	36.8	35.1	38.8
IA	16	40.0	39.9	40.1	39.1	37.4	36.7	36.6		38.4	35.7	38.2
MO	24	38..3	40.5	39.0	38.8	40.4	35.3	37.9	36.1	36.7	36.9	38.0
ND	7	23.1	24.8	39.9	39.8	40.1	27.1	29.0	32.2	26.5	29.2	31.2
SD	5	0.0		7.8	14.3	14.5	21.3	21.0	20.0	27.6	23.1	16.6
Weighted Mean		44.6	42.9	42.7	47.8	47.9	45.1	44.9	42.9	44.9	42.0	

The mean of the percentage of total revenue received from non-federal government appropriation by educational orientation was 44.7% for Applied Sciences-oriented institutions and 44.5% for Arts and Sciences-oriented institutions, a 0.4% difference (see rightmost column, Table 21).

Table 21. Mean % of Total Revenue Received from Non-Federal Government Appropriations by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	45.9	43.0	42.3	49.6	49.5	45.3	45.0	40.2	44.4	41.8	44.7
A&S	67	44.5	42.6	45.6	47.5	47.8	45.6	45.2	36.9	45.8	44.0	44.5

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Michigan, North Dakota, South Dakota, and Wisconsin were significantly different from other states; Iowa, Missouri, and Ohio were not significantly different from each other but each was significantly different from the following groups of states that were not significantly different from each other although these groups were significantly different from one another: Illinois and Minnesota, and Kansas and Nebraska. Also, Indiana was not significantly different from Missouri although it was significantly different from Iowa and Ohio (see Table 22).

Table 22. Tukey Test Results for the % of Total Revenue Received from Non-Federal Government Appropriations by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.000	1.000										
IN	0.719	0.000	1.000									
KS	0.000	0.000	0.000	1.000								
MI	0.000	0.003	0.000	0.001	1.000							
MN	0.000	1.000	0.000	0.000	0.019	1.000						
MO	1.000	0.000	0.857	0.000	0.000	0.000	1.000					
ND	0.001	0.000	0.115	0.000	0.000	0.000	0.002	1.000				
NE	0.000	0.000	0.000	1.000	0.048	0.000	0.000	0.000	1.000			
OH	0.995	0.000	0.029	0.000	0.000	0.000	0.986	0.000	0.000	1.000		
SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	1.000	
WI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Percentage of Total Revenue Received from Other Sources of Revenue (ROS%)

NCES (2005) considers state appropriation to include the following: "federal operating grants and contracts, state operating grants and contracts, local operating grants and contracts, other operating sources, federal appropriations, federal nonoperating grants, state nonoperating grants, local nonoperating grants, gifts (including contributions from affiliated organizations), investment income, other nonoperating revenues, and total other revenues and additions."

The overall mean of the percentage of total revenue received from other sources of revenue by state ranged from 22.6% in Wisconsin to 54.7% in South Dakota (see rightmost column, Table 23). The weighted mean by year ranged from 29.9% to 38.6% with an 11.9% increase in the percentage of total revenue received from other sources of revenue over the 10-year period (see bottom row, Table 23).

Table 23. Mean % of Total Revenue Received from Other Sources of Revenue by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
SD	5	70.9		62.2	62.5	57.3	50.1	49.6	52.5	41.8	45.3	54.7
ND	7	47.3	44.3	32.7	33.5	37.9	45.1	34.7	50.3	46.9	43.0	41.6
MO	24	36.9	36.2	37.8	40.1	39.6	40.0	37.3	45.0	40.6	39.0	39.2
IA	16	37.1	36.5	34.9	36.8	38.5	39.6	39.7		42.8	44.7	38.9
IL	49	31.2	52.9	37.7	30.9	31.4	35.6	36.8	41.1	38.5	44.4	38.1
IN	16	34.6	32.5	54.3	33.6	34.8	33.7	33.2	39.0	41.0	36.8	37.4
KS	29	29.7	28.9	30.2	27.3	28.0	27.5	29.6	55.2	28.9	33.2	31.9
MI	31	30.2	30.1	28.3	28.1	27.3	31.4	32.2	26.4	32.0	33.5	29.9
NE	8	31.6	31.8	32.3	27.7	29.1	27.6	27.9	28.0	28.9	28.8	29.4
MN	30	36.2	28.9	29.0	25.9	25.7	25.9	28.3		28.3	27.7	28.4
OH	38	23.0	23.0	22.0	25.0	26.5	22.2	23.3	33.9	31.1	30.8	26.1
WI	18	20.7	19.9	23.1	19.7	20.9	23.7	23.9	23.0	24.7	26.6	22.6
Weighted Mean		31.8	33.8	32.7	29.9	30.5	31.3	31.7	38.6	34.2	35.6	

The mean of the percentage of total revenue received from other sources of revenue by educational orientation was 32.7% for Applied Sciences-oriented institutions and 32.6% for Arts and Sciences-oriented institutions, a 0.3% difference (see rightmost column, Table 24).

Table 24. Mean % of Total Revenue Received from Other Sources of Revenue by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	30.7	33.9	32.9	29.1	29.4	31.2	31.5	37.3	35.0	36.2	32.7
A&S	67	31.6	33.2	30.9	30.2	30.9	30.2	31.3	42.2	31.9	33.6	32.6

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Ohio, South Dakota, and Wisconsin were significantly different from other states; Iowa, Illinois, Indiana, and Missouri were not significantly different from each other, but each was significantly different from the following group of states that was not significantly different from one another: Kansas, Missouri, Minnesota, and Nebraska. Also, North Dakota was similar to Iowa and Missouri although it was significantly different from Illinois and Indiana (see Table 25).

Table 25. Tukey Test Results for the % of Total Revenue Received from Non-Federal Government Appropriations by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	1.000	1.000										
IN	0.994	1.000	1.000									
KS	0.000	0.000	0.000	1.000								
MI	0.000	0.000	0.000	1.000	1.000							
MN	0.000	0.000	0.000	0.996	0.791	1.000						
MO	1.000	1.000	0.999	0.000	0.000	0.000	1.000					
ND	0.811	0.440	0.283	0.000	0.000	0.000	0.762	1.000				
NE	0.000	0.000	0.001	1.000	1.000	1.000	0.000	0.000	1.000			
OH	0.000	0.000	0.000	0.034	0.001	0.399	0.000	0.000	0.536	1.000		
SD	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.070	0.000	0.000	1.000	
WI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.221	0.000	1.000

Amount Received from Tuition and Fees per Student (RTFS)

NCES (2005) considers tuition and fees to be "revenues from all tuition and fees assessed against students (net of refunds and discounts and allowances) for educational purposes" and FTE students to be "equal to one student enrolled full time for one academic year." Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The overall mean of the amount received from tuition and fees per student by state ranged from $1,640 in Illinois to $3,507 in Ohio (see rightmost column, Table 26). The weighted mean by year ranged from $2,095 to $2,633 with a 0.4% increase in the amount received from tuition and fees per student over the 10-year period (see bottom row, Table 26).

Table 26. Mean Amount Received from Tuition and Fees per Student by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
OH	38	3,706	3,657	3,732	3,811	3,837	3,755	3,425	2,867	3,056	3,221	3,507
SD	5	3,188		3,048	2,725	2,875	3,311	2,935	2,858	3,207	3,488	3,070
MN	30	2,532	2,693	3,086	3,400	3,148	3,034	2,994		3,060	3,278	3,025
IA	16	2,868	2,957	3,049	3,160	3,053	3,178	3,084		2,276	2,454	2,898
ND	7	2,745	2,306	2,793	2,336	2,442	3,023	2,673	2,418	2,201	2,298	2,523
IN	16	2,554	2,759	2,735	2,833	2,905	2,499	2,552	2,060	2,103	2,152	2,515
MI	31	2,614	2,572	2,604	2,621	2,724	2,683	2,702	2,303	2,082	2,182	2,509
MO	24	2,144	1,988	2,210	2,261	2,192	2,579	2,669	2,787	2,374	2,790	2,399
WI	18	2,002	2,044	2,098	2,188	2,355	2,446	2,326	1,752	1,909	2,253	2,137
NE	8	1,669	1,630	1,703	1,867	1,814	1,806	1,799	2,107	1,603	1,657	1,765
KS	29	1,555	1,731	1,580	1,632	1,690	1,820	1,685	1,727	1,651	2,156	1,723
IL	49	1,641	1,658	1,664	1,716	1,784	1,937	1,951	1,257	1,368	1,428	1,640
Weighted Mean		2,384	2,391	2,488	2,561	2,573	2,633	2,554	2,095	2,188	2,394	

The mean of the amount received from tuition and fees per student by educational orientation was $2,514 for Applied Sciences-oriented institutions and $2,268 for Arts and Sciences-oriented institutions, a 10.8% difference (see rightmost column, Table 27).

Table 27. Mean Amount Received from Tuition and Fees per Student by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	2,458	2,476	2,561	2,634	2,682	2,734	2,638	2,270	2,255	2,433	2,514
A&S	67	2,236	2,203	2,319	2,397	2,348	2,355	2,326	2,295	2,024	2,181	2,268

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Ohio and Wisconsin were significantly different from other states; Indiana, Michigan, Missouri, and North Dakota were not significantly different from each other, but each was significantly different from the following groups of states that were not significantly different from each other although these groups were significantly different from one another: Iowa and South Dakota, and Illinois, Kansas, and Nebraska. Also, Minnesota was not significantly different from South Dakota and was similar to Iowa (see Table 28).

Table 28. Tukey Test Results for the Amount Received from Tuition and Fees per Student by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.000	1.000										
IN	0.001	0.000	1.000									
KS	0.000	0.995	0.000	1.000								
MI	0.000	0.000	1.000	0.000	1.000							
MN	0.786	0.000	0.000	0.000	0.000	1.000						
MO	0.000	0.000	0.987	0.000	0.894	0.000	1.000					
ND	0.061	0.000	1.000	0.000	1.000	0.000	0.997	1.000				
NE	0.000	1.000	0.000	1.000	0.000	0.000	0.000	0.000	1.000			
OH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000		
SD	0.984	0.000	0.002	0.000	0.002	1.000	0.000	0.023	0.000	0.018	1.000	
WI	0.000	0.000	0.004	0.000	0.000	0.000	0.340	0.106	0.004	0.000	0.000	1.000

Amount Received from Non-Federal Government Appropriations Per Student (RSLS)

NCES (2005) considers state appropriation to be "amounts received by the institution through acts of a state legislative body, except grants and contracts and capital appropriations," local appropriations to be "government appropriations made by a governmental entity below the state level" and FTE students to be "equal to one student enrolled full time for one academic year." Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The overall mean of the amount received from non-federal government appropriations per student by state ranged from $3,404 in South Dakota to $10,744 in Wisconsin (see rightmost column, Table 29). The weighted mean by year ranged from $4,853 to $5,870 with a 9.5% increase in the amount received from non-federal government appropriations per student over the 10-year period (see bottom row, Table 29).

Table 29. Mean Amount Received from Non-Federal Government Appropriations per Student by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
WI	18	9,518	9,859	10,245	10,246	11,194	11,175	10,201	10,695	11,951	12,356	10,744
NE	8	5,058	4,952	5,574	6,199	6,723	6,777	6,650	9,482	6,616	6,390	6,442
MI	31	5,495	5,082	5,638	6,001	6,311	6,240	6,186	7,167	7,432	6,667	6,222
KS	29	5,140	5,862	5,420	5,609	6,095	6,176	6,084	7,830	6,030	6,198	6,044
MN	30	4,656	6,435	5,987	6,451	6,372	5,685	5,374		5,290	4,874	5,680
IA	16	5,110	5,071	4,928	5,204	4,800	5,050	4,893		4,735	4,640	4,937
IL	49	4,375	2,562	3,856	4,717	5,111	5,001	5,041	4,751	4,448	4,803	4,466
OH	38	4,057	4,278	4,297	5,415	5,162	4,688	4,595	4,164	3,835	3,783	4,427
IN	16	4,214	4,948	5,626	4,145	4,274	4,736	4,471	3,471	3,567	3,660	4,311
ND	7	3,492	3,168	4,099	3,695	4,131	4,287	4,196	4,292	4,233	4,052	3,964
MO	24	3,328	3,439	3,556	3,649	3,917	4,982	4,909	4,516	3,530	3,207	3,903
SD	5			2,596	2,534	2,510	4,602	3,528	3,606	4,015	3,844	3,404
Weighted Mean		4,861	4,853	5,124	5,494	5,705	5,722	5,544	5,870	5,398	5,323	

The mean of the amount received from non-federal government appropriations per student by educational orientation was $5,579 for Applied Sciences-oriented institutions and $4,769 for Arts and Sciences-oriented institutions, a 17.0% difference (see rightmost column, Table 30).

Table 30. Mean Amount Received from Non-Federal Government Appropriations per Student by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	5,171	4,951	5,502	6,062	6,299	5,979	5,845	4,856	5,608	5,518	5,579
A&S	67	4,378	4,746	4,402	4,982	5,143	5,057	4,824	4,046	5,028	5,081	4,769

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Iowa and Wisconsin were significantly different from other states; Illinois, Indiana, North Dakota, Ohio, and South Dakota were not significantly different from each other, but each was significantly different from the following group of states that were not significantly different from each other: Kansas, Michigan, Minnesota, and Nebraska. Also, Missouri was not significantly different from Indiana, North Dakota, Ohio, and South Dakota, although it was significantly different from Illinois (see Table 31).

Table 31. Tukey Test Results for the Amount Received from Non-Federal Government Appropriations per Student by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.336	1.000										
IN	0.094	0.985	1.000									
KS	0.003	0.000	0.000	1.000								
MI	0.000	0.000	0.000	0.975	1.000							
MN	0.047	0.000	0.000	0.998	0.353	1.000						
MO	0.005	0.471	0.999	0.000	0.000	0.000	1.000					
ND	0.266	0.977	1.000	0.000	0.000	0.000	1.000	1.000				
NE	0.007	0.000	0.000	0.998	1.000	0.889	0.000	0.000	1.000			
OH	0.139	1.000	1.000	0.000	0.000	0.000	0.853	0.998	0.000	1.000		
SD	0.445	0.958	0.999	0.002	0.000	0.008	1.000	1.000	0.001	0.989	1.000	
WI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Amount Received from Other Sources of Revenue Per Student (ROSS)

NCES (2005) considers state appropriation to be "federal operating grants and contracts, state operating grants and contracts, local operating grants and contracts, other operating sources, federal appropriations, federal nonoperating grants, state nonoperating grants, local nonoperating grants, gifts (including contributions from affiliated organizations), investment income, other nonoperating revenues, and total other revenues and additions" and FTE students to be "equal to one student enrolled full time for one academic year." Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The overall mean of the amount received from other sources of revenue per student by state ranged from $2,872 in Ohio to $11,603 in North Dakota (see rightmost column, Table 32). The weighted mean by year ranged from $3,453 to $4,707 with a 32.0% increase in the amount received from other sources of revenue per student over the 10-year period (see bottom row, Table 32).

Table 32. Mean Amount Received from Other Sources of Revenue per Student by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
ND	7	13,201	11,582	3,369	3,140	3,909	23,361	27,728	9,932	10,895	8,909	11,603
SD	5	7,783		6,557	8,568	6,612	5,682	5,165	10,961	4,522	8,662	7,168
IA	16	4,734	4,700	4,308	4,921	5,077	5,523	5,356		5,303	5,951	5,097
MO	24	3,291	3,272	3,767	3,978	4,070	5,447	4,444	6,391	4,590	4,083	4,333
NE	8	3,921	3,496	3,832	3,113	3,479	3,317	3,383	4,511	3,378	8,854	4,129
MN	30	3,838	4,151	3,874	5,105	3,439	3,440	3,399		3,734	4,447	3,936
MI	31	3,601	3,409	3,294	3,473	3,464	3,877	4,942	3,526	4,732	4,553	3,887
IL	49	2,813	4,726	3,446	2,917	3,200	3,782	3,990	4,204	3,869	5,203	3,815
IN	16	3,669	3,756	3,727	3,557	3,847	3,757	3,585	3,639	4,180	3,703	3,742
WI	18	2,988	2,938	3,211	3,040	3,619	3,879	3,851	3,698	4,479	4,940	3,664
KS	29	2,832	3,035	3,338	2,764	3,005	2,892	2,906	5,571	3,162	3,611	3,312
OH	38	2,365	2,452	2,313	3,040	3,156	2,604	2,655	3,691	3,195	3,250	2,872
Weighted Mean		3,566	3,830	3,453	3,598	3,573	4,277	4,435	4,692	4,169	4,707	

The mean of the amount received from other sources of revenue per student by educational orientation was $4,123 for Arts and Sciences-oriented institutions and $4,032 for Applied Sciences-oriented institutions, a 2.3% difference (see rightmost column, Table 33).

Table 33. Mean Amount Received from Other Sources of Revenue per Student by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
A&S	67	3,972	4,427	3,098	3,225	3,388	3,404	4,285	6,501	4,028	4,906	4,123
AS	204	3,352	3,667	3,544	3,805	3,640	4,471	4,567	4,331	4,234	4,711	4,032

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. North Dakota was significantly different from other states; Iowa, Missouri, and Nebraska were not significantly different from each other, but each was significantly different from the following group of states that was not significantly different from each other: Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, and Wisconsin. Nebraska was also similar to the states of Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, and Wisconsin. Also, South Dakota was similar to Iowa although it was significantly different from Missouri and

Nebraska; Ohio was similar to Indiana and Wisconsin although it was significantly different from Illinois, Kansas, Michigan, Minnesota, Missouri, and Nebraska (see Table 34).

Table 34. Tukey Test Results for the Amount Received from Other Sources of Revenue per Student by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.202	1.000										
IN	0.374	1.000	1.000									
KS	0.006	0.788	0.982	1.000								
MI	0.426	1.000	1.000	0.743	1.000							
MN	0.421	1.000	1.000	0.773	1.000	1.000						
MO	0.935	1.000	1.000	0.649	1.000	1.000	1.000					
ND	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000				
NE	0.984	1.000	1.000	0.889	1.000	1.000	1.000	0.000	1.000			
OH	0.000	0.149	0.718	1.000	0.165	0.193	0.202	0.000	0.586	1.000		
SD	0.747	0.022	0.031	0.001	0.040	0.039	0.161	0.000	0.273	0.000	1.000	
WI	0.246	1.000	1.000	0.991	1.000	1.000	0.998	0.000	1.000	0.770	0.021	1.000

Multiple Regression Analysis of Revenue Structure/Patterns

Research Questions 4 through 7 were analyzed for relationships between the revenue structure/patterns of public 2-year institutions and on the retention rates, the expenditure structure, and the expenditure patterns.

Research Question 4

Research Question 4 used regression analysis to ascertain whether between 1994-1995 and 2003-2004 the revenue structure of public 2-year institutions was able to predict the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses. The null hypothesis was that the revenue structure was not able to predict any of the dollar amounts spent as a percentage of total funding.

Variables measuring the percentages spent on instruction (EIN%), academic support (EAS%), student services (ESS%), institutional support (EIS%), and other expenses (EOE%), the percentages of total revenue received from tuition and fees (RTF%), non-

federal government appropriations (RSL%), and other sources of revenue (ROS%) were assessed for missing data and outliers prior to multiple regression analysis. In Research Question 4, each of the variables within the expenditure patterns was tested individually as the dependent variables, resulting in the following equations being estimated:

$$EIN\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$$

$$EAS\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$$

$$ESS\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$$

$$EIS\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$$

$$EOE\% = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$$

The variables were tested for multicollinearity, which indicates a high intercorrelation between the independent variables. With VIFs ranging from 1.000 to 1.187, multicollinearity was not considered to be a problem.

Percentage of Total Expenditures Spent on Instruction. A standardized regression coefficient was determined for the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C), resulting in the following equation:

$$EIN\% = .471 - .232 ROS\%$$

In other words, the percentage of total revenue received from other sources of revenue has a negative effect on the percentage of total expenditures spent on instruction. (RTF% and RSL% were excluded variables since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null

hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .111.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EIN\% = .306 + .319RTF\% \qquad R^2 = .132$$

Applied Sciences-Oriented

$$EIN\% = .511 - .080RTF\% - .281ROS\% \qquad R^2 = .149$$

For Arts and Sciences-oriented institutions, a positive relationship was found between the percentage of total revenue received from tuition and fees and the percentage of total expenditures spent on instruction. For Applied Sciences-oriented institutions, both the percentage of total revenue received from tuition and fees and the percentage of total revenue received from other sources of revenue had a negative effect on the percentage of total expenditures spent on instruction.

Percentage of Total Expenditures Spent on Academic Support. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EAS\% = .059 + .087RTF\% - .022ROS\%$$

In other words, percentage of total revenue received from tuition and fees had a positive effect on the percentage spent on academic support and the percentage of total revenue

received from other sources of revenue had a negative effect on the percentage spent on academic support. (RSL% was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .047.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EAS\% = .094 + .051RTF\% - .093ROS\% \qquad R^2 = .086$$

Applied Sciences-Oriented

$$EAS\% = .050 + .093RTF\% \qquad R^2 = .045$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, positive relationships were found between the percentage of total revenue received from tuition and fees and the percentage spent on academic support. For Arts and Sciences-oriented institutions, there also was a negative relationship found between the percentage of total revenue received from other sources and the percentage spent on academic support.

Percentage of Total Expenditures Spent on Student Services. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$ESS\% = .102 - .042ROS\%$$

In other words, percentage of total revenue received other sources of revenue had a negative effect on the percentage spent on student services. (RTF% and RSL% were excluded variables since they had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .022.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$ESS\% = .111 - .067ROS\% \qquad R^2 = .044$$

Applied Sciences-Oriented

$$ESS\% = .100 - .037ROS\% \qquad R^2 = .018$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, negative relationships were found between the percentage of total revenue received from other sources of revenue and the percentage spent on student services.

Percentage of Total Expenditures Spent on Institutional Support. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EIS\% = .134 - .055RTF\% + .039ROS\%$$

In other words, the percentage of total revenue received from tuition and fees has a negative effect on the percentage of total expenditures on institutional support and the percentage of total revenue received from other sources of revenue has a positive effect on the percentage of total expenditures spent on institutional support. (RSL% was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .025.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EIS\% = .175 - .172RTF\% \qquad R^2 = .071$$

Applied Sciences-Oriented

$$EIS\% = .123 - .029RTF\% + .052ROS\% \qquad R^2 = .026$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, negative relationships were found between the percentage of total revenue received from tuition and fees and the percentage of total expenditures spent on institutional support. Also, for Applied Sciences-oriented institutions, the percentage of total revenue received from other sources of

revenue had a positive effect on the percentage of total expenditures spent on institutional support.

Percentage of Total Expenditures Spent on Other Expenses. A standardized regression coefficient was determined for the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EOE\% = .224 + .263ROS\%$$

In other words, the percentage of total revenue received from other sources of revenue has a positive effect on the percentage of total expenditures spent on other expenses. (RTF% and RSL% were excluded variables since they had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .180.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EOE\% = .299 - .176RTF\% + .190ROS\% \qquad R^2 = .187$$

Applied Sciences-Oriented

$$EIN\% = .218 + .270ROS\% \qquad R^2 = .190$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, positive relationships were found between the percentage of total revenue received from other sources of revenue and the percentage of total expenditures spent on other expenses. Also, for Arts and Sciences-oriented institutions, the percentage of total revenue received from tuition and fees had a negative effect on the percentage of total expenditures spent on other expenses.

Research Question 5

For Research Question 5, regression analysis was used to ascertain whether in the 2003-2004 fiscal year the revenue structure of public 2-year institutions alone were able to predict first-year retention rates. The null hypothesis was that the revenue structure was not able to predict first-year retention rates.

The data for first-year retention rates (RETR), the percentage of total revenue received from tuition and fees (RTF%), the percentage of total revenue received from non-federal government appropriations (RSL%), and the percentage of total revenue received from other sources of revenue (ROS%) were gathered and the data set was analyzed for missing data and outliers before the multiple regression analysis occurred. The following equation was tested:

$$RETR = \beta_0 + \beta_1 RTF\% + \beta_2 RSL\% + \beta_3 ROS\%$$

The model was checked for multicollinearity, which indicates a high intercorrelation between the independent variables. With a VIF of 1.138, multicollinearity was not considered to be a problem.

A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C). Next, a *t*-test was conducted on each of the standardized regression's

coefficients for the independent variables using Type I error level of $\alpha \leq .05$. When the *t*-test was conducted, it was found that the null hypothesis could not be rejected. Additionally, the *F*-test was conducted with Type I error level $\alpha \leq .05$ determined the level of linearity between the independent and dependent variables. When the *F*-test was conducted, it also was found that the null hypothesis could not be rejected. Thus, it appears that in the 2003-2004 fiscal year the revenue structure of public 2-year institutions alone could not be determined to predict first-year retention rates.

When the questions again were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institutions, it was also found that in the 2003-2004 fiscal year, the revenue structure of public 2-year institutions alone could not be determined to predict first-year retention rates for the individual types of institutions.

Overall, no relationship could be determined between the revenue structure and first year retention rates for public 2-year institutions in general or specifically for Arts and Sciences-oriented or Applied Sciences-oriented institutions.

Research Question 6

Research Question 6 used regression analysis to ascertain whether between 1994-1995 and 2003-2004 the revenue patterns of public 2-year institutions were able to predict the amount spent per student for instruction, academic support, student services, institutional support, and all other expenses. The null hypothesis was that these revenue patterns were not able to predict any of the dollar amounts spent per student.

Variables measuring the amounts spent per student for instruction (EINS), academic support (EASS), student services (ESSS), institutional support (EISS), other expenses (EOES), the amounts received for tuition and fees per student (RTFS), non-federal

government appropriations per student (RSLS), and other sources of revenue per student (ROSS) were assessed for missing data and outliers prior to multiple regression analysis. In Research Question 6, each of the variables within the expenditure patterns was tested individually as the dependent variables, resulting in the following equations being tested:

$$EINS = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$$

$$EASS = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$$

$$ESSS = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$$

$$EISS = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$$

$$EOES = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$$

Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The variables were tested for multicollinearity, which indicates a high intercorrelation between the independent variables. With VIFs ranging from 1.004 to 1.065, multicollinearity was not considered to be a problem.

Amount Spent on Instruction per Student. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EINS = -370.583 + .503RTFS + .548RSLS + .201ROSS$$

In other words, the amounts received for tuition and fees per student, non-federal government appropriations per student, and other sources of revenue per student all have positive effects on the amount spent on instruction per student.

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .568.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EINS = 53.079 + .697RTFS + .260RSLS + .274ROSS \qquad R^2 = .407$$

Applied Sciences-Oriented

$$EINS = -98.399 + .468RTFS + .574RSLS + .136ROSS \qquad R^2 = .625$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, positive relationships were found between the amounts received for the tuition and fees per student, non-federal government appropriations per student, and other sources of revenue per student to the amount spent on instruction per student.

Amount Spent on Academic Support per Student. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EASS = 152.119 + .136RTFS + .040RSLS + .027ROSS$$

In other words, the amounts received for tuition and fees per student, non-federal government appropriations per student, and other sources of revenue per student all have positive effects on the amount spent on academic support per student.

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .115.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$EASS = -376.352 + .170RTFS + .142RSLS + .034ROSS$ $\quad R^2 = .259$

Applied Sciences-Oriented

$EASS = 192.851 + .131RTFS + .030RSLS + .029ROSS$ $\quad R^2 = .106$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, positive relationships were found between the amounts received for the tuition and fees per student, non-federal government appropriations per student, and other sources of revenue per student to the amount spent on instruction per student.

Amount Spent on Student Services per Student. A standardized regression coefficient was determined for each of the independent variables to measure the amount of

influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$ESSS = 86.573 + .089RTFS + .109RSLS + .035ROSS$$

In other words, the amounts received for tuition and fees per student, non-federal government appropriations per student, and other sources of revenue per student all have positive effects on the amount spent on student services per student.

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .270.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$ESSS = -151.636 + .122RTFS + .147RSLS + .032ROSS$ $\quad R^2 = .259$

Applied Sciences-Oriented

$ESSS = 111.965 + .080RTFS + .105RSLS + .040ROSS$ $\quad R^2 = .273$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, positive relationships were found between the amounts received for the tuition and fees per student, non-federal government appropriations per student, and other sources of revenue per student to the amount spent on instruction per student.

Amount Spent on Institutional Support per Student. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EISS = 626.010 + .090RSLS + .102ROSS$$

In other words, the amounts received for non-federal government appropriations per student and the amount received from other sources of revenue per student both have positive effects on the amount spent on institutional support per student. (RTFS was an excluded variable since it had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .256.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$EISS = 223.245 + .173RSLS + .107ROSS \qquad R^2 = .346$$

Applied Sciences-Oriented

$$EISS = 69.851 + .081RSLS + .104ROSS \qquad R^2 = .239$$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, positive relationships were found between the amounts received for non-federal government

appropriations per student and other sources of revenue per student to the amount spent on institutional support per student.

Amount Spent on Other Expenses per Student. A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$EOES = 1{,}256.346 + .211RTFS + .142RSLS + .246ROSS$$

In other words, the amounts received for tuition and fees per student, non-federal government appropriations per student, and other sources of revenue per student all have positive effects on the amount spent on other expenses per student.

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .022.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$EOES = 1{,}323.991 + .211RSLS + .276ROSS$ $\qquad R^2 = .400$

Applied Sciences-Oriented

$EOES = 1{,}066.996 + .228RTFS + .134RSLS + .296ROSS$ $\qquad R^2 = .283$

For both Arts and Sciences-oriented and Applied Sciences-oriented institutions, positive relationships were found between the amounts received for non-federal government appropriations per student and other sources of revenue per student to the amount spent on other expenses per student. Also, for Applied Sciences-oriented institutions, a positive relationship was found between the amount received for tuition and fees per student and the amount spent on other expenses per student.

Research Question 7

Research Question 7 used regression analysis to ascertain whether in the 2003-2004 fiscal year the revenue patterns of public 2-year institutions alone were able to predict first-year retention rates. The null hypothesis was that the revenue patterns were not able to predict first-year retention rates.

Variables measuring first-year retention rates (RETR), the amounts received from tuition and fees per student (RTFS), non-federal government appropriations per student (RSLS), and other sources of revenue per student (ROSS) were assessed for missing data and outliers prior to multiple regression analysis. The following equation was tested:

$$RETR = \beta_0 + \beta_1 RTFS + \beta_2 RSLS + \beta_3 ROSS$$

Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The variables were tested for multicollinearity, which indicates a high intercorrelation between the independent variables. With a VIF of 1.000, multicollinearity was not considered to be a problem.

A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$RETR = 55.128 + .001RSLS$$

In other words, the amount received from non-federal government appropriations per student appears to have a positive effect on first-year retention rates. (RTFS and ROSS were excluded variables since they had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using a Type I error of .05 led to rejection of the null hypothesis. Additionally, the *F*-test conducted with a level of significance of .05 determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in the dependent variable that could be explained by the independent variables and the R^2 was .036.

When the questions were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institution, the following relationships were found:

Arts and Sciences-Oriented

$$RETR = 51.354 + .001RSLS \qquad R^2 = .112$$

Applied Sciences-Oriented

$$RETR = 61.503 - .001ROSS \qquad R^2 = .030$$

For Arts and Sciences-oriented institutions, a positive relationship was found between the amounts received from non-federal government appropriations per student to the first-year retention rates. For Applied Sciences-oriented institutions, a negative relationship was found

between the amounts received from other sources of revenue per student to the first-year retention rates.

Expenditure Structure/Patterns

The next research question (Research Question 8) focused on the relationship between the expenditure structure of (1) the percentage of total expenses spent on instruction, (2) the percentage of total expenses spent on academic support, (3) the percentage of total expenses spent on student services, (4) the percentage of total expenses spent on institutional support, and (5) the percentage of total expenses spent on all other expenses and first-year retention rates of a public 2-year institution. The final research question (Research Question 9) focused on the relationship between the expenditure patterns of (1) instruction per student, (2) academic support per student, (3) student support per student, (4) institutional support per student, and (5) all other expenditures per student and first-year retention rates of a public 2-year institution. Research Question 8 focused on whether the expenditure structure was able to predict the first-year retention rates. The null hypothesis stated that the expenditure structure would not affect first-year retention rates. Research Question 9 focused on whether the expenditure patterns were able to predict the first-year retention rates. The null hypothesis stated that the expenditure patterns would not affect the retention rates.

Trend Analysis of Expenditure Structure/Patterns

Before analyzing the research questions, the variables within the expenditure structure/patterns were analyzed and compared by state as well as educational orientation (i.e., Arts and Sciences-oriented or Applied Sciences-oriented). Educational orientation was determined by the number of associate's degrees awarded in the 2003-2004 academic year. Institutions with more than 50% of their degrees awarded in Arts and Sciences were

considered to be Arts and Sciences-oriented while institutions with more than 50% of their degrees awarded in Applied Sciences were considered to be Applied Sciences-oriented.

Percentage of Total Expenditures Spent on Instruction (EIN%)

NCES (2005) considers expenditures on instruction to be a "functional expense category that includes expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public service that are not separately budgeted."

The overall mean of the percentage of total expenditures spent on instruction by state ranged from 34.6% in Michigan to 55.7% in Wisconsin (see rightmost column, Table 35). The weighted mean by year ranged from 36.2% to 40.4% with a 4.7% decrease in the percentage of total expenditures spent on instruction over the 10-year period (see bottom row, Table 35).

Table 35. Mean % of Total Expenditures Spent on Instruction by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
WI	18	58.8	58.9	58.3	58.1	56.8	54.9	54.8	52.0	53.2	51.1	55.7
IA	16	45.5	45.0	45.3	44.0	44.3	43.5	43.4		38.7	38.9	43.2
SD	5	27.4		45.7	38.3	38.0	38.4	38.4	44.4	44.4	44.8	40.0
MN	30	39.9	38.4	35.8	37.6	38.9	39.8	39.5		41.0	41.3	39.1
IN	16	37.3	38.1	37.9	37.7	37.1	40.3	38.4	42.2	42.0	40.2	39.1
OH	38	39.9	38.4	38.3	39.9	38.6	40.1	39.8	38.2	39.3	38.6	39.1
KS	29	36.0	41.4	41.0	40.2	39.5	39.5	39.3	37.0	35.2	41.5	39.1
ND	7	44.3	43.5	41.9	36.9	35.1	32.1	29.9	38.3	42.6	33.4	37.8
MO	24	39.4	38.4	38.0	39.2	36.3	39.0	40.3	29.8	36.0	39.3	37.6
NE	8	38.1	38.6	37.7	35.2	39.7	38.2	38.1	23.4	40.2	38.5	36.8
IL	49	39.8	37.7	36.2	35.6	33.8	33.5	32.6	32.8	35.1	33.3	35.0
MI	31	37.5	37.1	37.4	35.2	34.6	33.8	32.9	32.3	33.3	32.4	34.6
Weighted Mean		40.4	40.4	39.7	39.4	38.6	38.9	38.5	36.2	38.6	38.5	

The mean of the percentage of total expenditures spent on instruction by educational orientation was 39.9% for Applied Sciences-oriented institutions and 37.0% for Arts and Sciences-oriented institutions, a 7.8% difference (see rightmost column, Table 36).

Table 36. Mean % of Total Expenditures Spent on Instruction by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	41.2	40.7	40.5	40.3	39.6	39.7	39.2	39.2	39.5	39.5	39.9
A&S	67	39.7	40.0	37.8	36.9	36.6	36.6	36.1	34.1	36.9	35.3	37.0

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Wisconsin was significantly different from other states; Indiana, Kansas, Minnesota, Missouri, North Dakota, Nebraska, Ohio, and South Dakota were not significantly different from each other, but each was significantly different from Illinois and Michigan, which were not significantly different from each other. Also, Iowa was not significantly different from South Dakota although it was significantly different from Indiana, Kansas, Minnesota, Missouri, North Dakota, Nebraska, Ohio, and South Dakota (see Table 37).

Table 37. Tukey Test Results for the % of Total Expenditures Spent on Instruction by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.000	1.000										
IN	0.003	0.000	1.000									
KS	0.004	0.000	1.000	1.000								
MI	0.000	1.000	0.000	0.000	1.000							
MN	0.000	0.000	1.000	1.000	0.000	1.000						
MO	0.000	0.007	1.000	0.982	0.004	0.999	1.000					
ND	0.000	0.737	0.960	0.818	0.566	0.945	1.000	1.000				
NE	0.001	0.301	0.997	0.956	0.184	0.995	1.000	1.000	1.000			
OH	0.000	0.000	1.000	1.000	0.000	1.000	0.999	0.942	0.995	1.000		
SD	0.935	0.003	0.994	0.999	0.001	0.990	0.905	0.679	0.842	0.987	1.000	
WI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Another possible consideration regarding instructional costs would be the reliance on adjunct faculty in public 2-year institutions. During the 2003-2004 academic year, Arts and Sciences-oriented institutions employed adjunct faculty that accounted for 20.0% to 95.8% of their total faculty whereas Applied Sciences-oriented institutions employed from 2.2% to 85.7% of their total faculty as adjunct faculty. Additionally, although the reliance on adjunct faculty in both types of institutions has increased from 2001 to 2004, it has increased at a

faster rate in the Arts and Sciences-oriented institutions (an average of 1.725% per year) than in the Applied Sciences-oriented institutions (an average of .975% per year).

Percentage of Total Expenditures Spent on Academic Support (EAS%)

NCES (2005) considers expenditures on academic support to be a "functional expense category that includes expenses of activities and services that support the institution's primary missions of instruction, research, and public service."

The overall mean of the percentage of total expenditures spent on academic support by state ranged from 3.9% in Wisconsin to 12.0% in Michigan (see rightmost column, Table 38). The weighted mean by year ranged from 6.4% to 7.9% with a 3.1% increase in the percentage of total expenditures spent on academic support over the 10-year period (see bottom row, Table 38).

Table 38. Mean % of Total Expenditures Spent on Academic Support by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
MI	31	11.3	11.8	12.4	11.8	12.1	12.3	12.2	13.9	12.1	10.3	12.0
NE	8	11.5	11.6	11.5	11.3	12.1	11.9	11.9	8.2	11.9	10.8	11.3
MN	30	7.3	7.7	8.8	9.6	10.5	10.6	10.9		10.0	10.2	9.5
OH	38	6.8	7.3	7.8	7.9	7.7	7.8	7.4	7.8	7.8	7.4	7.6
SD	5	7.5		4.8	9.0	9.0	8.9	7.8	10.3	5.0	4.0	7.4
KS	29	5.6	5.4	5.9	6.1	5.6	5.1	5.5	10.1	5.9	5.4	6.1
MO	24	5.2	5.7	6.6	6.8	6.6	5.3	4.9	6.0	6.8	5.5	5.9
ND	7	5.5	4.2	5.4	6.0	6.7	7.9	6.1	6.1	5.4	5.0	5.8
IN	16	6.0	5.8	5.8	6.1	6.0	5.6	5.9	5.6	5.5	4.9	5.7
IL	49	4.5	5.2	5.4	5.7	5.6	5.7	5.8	5.8	4.8	4.6	5.3
IA	16	5.4	5.0	5.2	5.5	5.3	5.1	5.0		5.4	5.3	5.2
WI	18	3.2	3.3	3.5	3.4	4.2	4.2	4.4	4.9	3.5	4.1	3.9
Weighted Mean		6.4	6.7	7.2	7.4	7.5	7.4	7.3	7.9	7.1	6.6	

The mean of the percentage of total expenditures spent on academic support by educational orientation was 7.6% for Arts and Sciences-oriented institutions and 7.0% for Applied Sciences-oriented institutions, an 8.6% difference (see rightmost column, Table 39).

Table 39. Mean % of Total Expenditures Spent on Academic Support by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
A&S	67	6.9	7.1	7.8	7.8	7.9	8.2	7.9	7.7	7.4	6.9	7.6
AS	204	6.4	6.6	7.0	7.4	7.4	7.2	7.2	7.0	7.1	6.6	7.0

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Minnesota and Wisconsin were significantly different from other states; Iowa, Illinois, Indiana, Kansas, Missouri, and North Dakota were not significantly different from each other, but each was significantly different from the following groups of states that were not significantly different from each other although these groups were significantly different from one another: Michigan and Nebraska, and Ohio and South Dakota (see Table 40).

Table 40. Tukey Test Results for the % of Total Expenditures Spent on Academic Support by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	1.000	1.000										
IN	0.986	0.964	1.000									
KS	0.995	0.984	1.000	1.000								
MI	0.000	0.000	0.000	0.000	1.000							
MN	0.000	0.000	0.000	0.000	0.000	1.000						
MO	0.931	0.851	1.000	1.000	0.000	0.000	1.000					
ND	0.989	0.986	1.000	1.000	0.000	0.000	1.000	1.000				
NE	0.000	0.000	0.000	0.000	1.000	0.001	0.000	0.000	1.000			
OH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.000	1.000		
SD	0.021	0.010	0.192	0.108	0.000	0.018	0.349	0.559	0.000	1.000	1.000	
WI	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	1.000

Percentage of Total Expenditures Spent on Student Services (ESS%)

NCES (2005) considers expenditures on student services to be a "functional expense category that includes expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program."

The overall mean of the percentage of total expenditures spent on student services by state ranged from 5.3% in Nebraska to 12.2% in Minnesota (see rightmost column, Table 41). The weighted mean by year ranged from 8.5% to 9.1% with a 2.4% increase in the percentage of total expenditures spent on student services over the 10-year period (see bottom row, Table 41).

Table 41. Mean % of Total Expenditures Spent on Student Services by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
MN	30	11.1	14.5	11.7	12.3	11.9	12.3	12.3		11.9	12.0	12.2
MI	31	10.7	10.8	10.8	11.9	11.6	12.3	12.1	11.6	13.2	13.0	11.8
KS	29	8.4	8.5	9.0	9.3	9.4	9.1	9.6	10.2	11.7	9.4	9.5
WI	18	9.0	9.0	8.6	9.1	9.1	9.1	9.1	9.6	9.1	8.7	9.0
OH	38	8.8	8.7	8.9	9.2	8.9	8.7	8.2	8.5	7.9	7.8	8.6
IL	49	8.4	8.3	8.0	8.2	8.1	7.9	7.3	7.6	8.4	7.9	8.0
MO	24	7.9	8.2	7.4	7.1	7.7	5.9	7.0	10.7	7.1	6.8	7.6
SD	5	5.2		5.7	5.2	5.3	5.6	5.0	10.7	9.0	7.4	6.6
IA	16	5.7	5.7	5.8	6.1	6.1	6.3	6.1		6.0	6.0	6.0
IN	16	6.1	6.4	6.2	6.2	5.7	5.4	5.2	5.6	5.7	5.6	5.8
ND	7	4.9	5.2	5.0	5.4	5.6	6.6	5.6	5.4	6.7	7.3	5.8
NE	8	6.4	5.6	5.6	6.8	4.2	5.4	5.7	0.7	6.3	6.2	5.3
Weighted Mean		8.5	9.0	8.5	8.9	8.7	8.6	8.5	8.7	9.1	8.7	

The mean of the percentage of total expenditures spent on student services by educational orientation was 8.7% for Arts and Sciences-oriented institutions and 8.6% for Applied Sciences-oriented institutions, a 1.2% difference (see rightmost column, Table 42).

Table 42. Mean % of Total Expenditures Spent on Student Services by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
A&S	67	9.0	8.6	8.5	8.4	8.9	9.0	8.8	8.0	9.3	9.0	8.7
AS	204	8.4	9.0	8.6	9.1	8.8	8.6	8.5	7.8	9.0	8.6	8.6

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Illinois was significantly different from other states; Iowa, Indiana, North Dakota, Nebraska, and South Dakota were not significantly different from each other, but each was significantly different from the following groups of states that were not significantly different from each other although these

groups were significantly different from one another: Kansas and Wisconsin, and Michigan and Minnesota. Also, Missouri was not significantly different from South Dakota but was significantly different from Iowa, Indiana, North Dakota, and Nebraska; Ohio was not significantly different from Wisconsin but was significantly different from Kansas (see Table 43).

Table 43. Tukey Test Results for the % of Total Expenditures Spent on Student Services by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.000	1.000										
IN	1.000	0.000	1.000									
KS	0.000	0.000	0.000	1.000								
MI	0.000	0.000	0.000	0.000	1.000							
MN	0.000	0.000	0.000	0.000	0.970	1.000						
MO	0.090	0.376	0.018	0.000	0.000	0.000	1.000					
ND	1.000	0.000	1.000	0.000	0.000	0.000	0.209	1.000				
NE	1.000	0.000	1.000	0.000	0.000	0.000	0.122	1.000	1.000			
OH	0.000	0.417	0.000	0.284	0.000	0.000	0.003	0.000	0.000	1.000		
SD	1.000	0.160	0.995	0.000	0.000	0.000	0.984	0.998	0.997	0.007	1.000	
WI	0.000	0.042	0.000	0.999	0.000	0.000	0.000	0.000	0.000	0.964	0.001	1.000

Percentage of Total Expenditures Spent on Institutional Support (EIS%)

NCES (2005) considers expenditures on institutional support to be a "functional expense category that includes expenses for the day-to-day operational support of the institution."

The overall mean of the percentage of total expenditures spent on institutional support by state ranged from 10.0% in North Dakota to 18.5% in Illinois (see rightmost column, Table 44). The weighted mean by year ranged from 12.9% to 14.0% with a 0.7% decrease in the percentage of total expenditures spent on institutional support over the 10-year period (see bottom row, Table 44).

Table 44. Mean % of Total Expenditures Spent on Institutional Support by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
IL	49	16.7	18.1	19.0	18.4	20.2	19.9	19.7	19.9	15.3	17.5	18.5
OH	38	13.1	13.1	13.3	13.5	13.4	13.5	12.9	13.5	13.5	13.8	13.4
SD	5	22.0		9.7	10.3	10.2	10.7	11.2	16.9	13.7	13.7	13.2
IA	16	12.4	12.0	12.5	13.2	13.4	13.9	13.2		12.9	14.1	13.1
KS	29	13.1	12.9	12.0	13.9	12.7	13.3	12.9	13.0	13.9	12.6	13.0
IN	16	13.0	13.4	13.4	13.2	12.5	14.2	12.0	13.3	12.8	11.2	12.9
NE	8	16.6	14.9	14.2	12.6	12.2	12.9	13.4	0.5	13.9	14.8	12.6
MI	31	10.4	10.8	11.1	11.5	11.2	11.8	11.4	12.9	12.0	13.0	11.6
MN	30	12.6	11.4	12.7	12.6	11.8	10.5	9.6		9.6	10.7	11.3
MO	24	12.8	12.0	10.8	11.0	9.9	8.7	9.4	14.2	11.5	10.5	11.1
WI	18	10.7	10.9	11.9	10.8	11.1	11.2	11.2	9.4	11.4	11.5	11.0
ND	7	13.2	8.9	9.4	8.5	10.1	9.1	8.4	9.7	12.0	10.9	10.0
Weighted Mean		13.4	13.2	13.4	13.5	13.4	13.4	13.0	14.0	12.9	13.3	

The mean of the percentage of total expenditures spent on institutional support by educational orientation was 13.7% for Arts and Sciences-oriented institutions and 13.3% for Applied Sciences-oriented institutions, a 3.0% difference (see rightmost column, Table 45).

Table 45. Mean % of Total Expenditures Spent on Institutional Support by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
A&S	67	13.6	14.0	13.6	13.2	13.9	13.6	13.2	14.8	13.0	14.5	13.7
AS	204	13.2	13.1	13.6	13.6	13.5	13.4	13.0	13.8	12.8	13.0	13.3

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Illinois was significantly different from other states; Iowa, Indiana, Kansas, Nebraska, Ohio, and South Dakota were not significantly different from each other, but each was significantly from Michigan, Minnesota, Missouri, South Dakota, and Wisconsin, which were not significantly different from one another (see Table 46).

Percentage of Total Expenditures Spent on Other Expenses (EOE%)

Expenditures on other expenses were considered to be all other institutional expenditures including those on research, public service, operation maintenance of plant,

depreciation, scholarships and fellowships expenses, other expenses and deductions, total nonoperating expenses and deductions.

Table 46. Tukey Test Results for the % of Total Expenditures Spent on Institutional Support by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.000	1.000										
IN	1.000	0.000	1.000									
KS	1.000	0.000	1.000	1.000								
MI	0.055	0.000	0.130	0.022	1.000							
MN	0.012	0.000	0.033	0.003	1.000	1.000						
MO	0.001	0.000	0.004	0.000	0.875	0.988	1.000					
ND	0.002	0.000	0.004	0.001	0.560	0.798	0.999	1.000				
NE	0.997	0.000	0.978	0.989	0.016	0.004	0.000	0.000	1.000			
OH	1.000	0.000	0.997	0.999	0.000	0.000	0.000	0.000	1.000	1.000		
SD	0.991	0.000	0.998	0.993	1.000	0.998	0.888	0.611	0.813	0.904	1.000	
WI	0.018	0.000	0.044	0.007	1.000	1.000	0.999	0.908	0.005	0.000	0.995	1.000

The overall mean of the percentage of total expenditures spent on other expenses by state ranged from 20.3% in Wisconsin to 37.1% in North Dakota (see rightmost column, Table 47). The weighted mean by year ranged from 30.4% to 31.5% with a 2.0% increase in the percentage of total expenditures spent on other expenses over the 10-year period (see bottom row, Table 47).

Table 47. Mean % of Total Expenditures Spent on Other Expenses by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
ND	7	32.0	32.5	38.3	43.2	42.5	39.4	40.6	32.0	33.3	37.4	37.1
MO	24	34.7	35.7	37.2	35.9	39.6	37.3	34.8	39.3	35.1	32.8	36.2
IN	16	37.6	36.3	36.7	36.9	38.7	34.5	34.7	33.3	34.0	35.0	35.8
IL	49	30.2	30.7	31.4	31.7	32.4	33.1	33.8	32.5	36.5	36.0	32.8
IA	16	31.1	32.3	31.3	31.2	30.9	31.2	32.3		37.1	35.8	32.6
SD	5	37.9		34.1	37.1	37.5	36.4	37.6	17.7	27.9	23.7	32.2
KS	29	32.2	30.9	30.0	30.1	31.2	31.7	31.3	29.7	33.3	31.1	31.1
OH	38	31.5	32.4	31.7	29.6	31.4	30.0	30.6	32.0	29.8	29.1	30.8
NE	8	27.4	29.4	31.1	34.1	31.9	31.5	30.9		27.7	29.6	30.4
MI	31	29.4	28.9	28.4	29.2	29.4	29.3	31.4	29.3	27.5	28.7	29.1
MN	30	27.2	28.1	31.0	27.9	26.9	26.8	27.7		27.6	25.8	27.7
WI	18	18.4	17.9	17.8	17.2	18.8	20.6	20.6	24.1	22.8	24.5	20.3
Weighted Mean		30.4	30.5	31.0	30.7	31.5	31.1	31.5	31.3	31.5	31.0	

The mean of the percentage of total expenditures spent on other expenses by educational orientation was 31.8% for Arts and Sciences-oriented institutions and 30.5% for Applied Sciences-oriented institutions, a 4.3% difference (see rightmost column, Table 48).

Table 48. Mean % of Total Expenditures Spent on Other Expenses by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
A&S	67	29.5	30.1	31.9	33.4	32.5	31.9	32.9	29.8	33.0	32.9	31.8
AS	204	30.1	30.2	30.2	29.4	30.5	30.5	30.8	31.7	30.8	30.3	30.5

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Minnesota and Wisconsin were significantly different from other states; Kansas, Nebraska, Ohio, and South Dakota were not significantly different from each other, but each was significantly from Indiana, Missouri, and North Dakota, which were not significantly different from one another. Also, Iowa and Illinois were not significantly different from one another and Iowa was not significantly different from Kansas and South Dakota but was significantly different from Nebraska and Ohio. Illinois was not significantly different from South Dakota but was significantly different from Kansas, Nebraska, and Ohio. Michigan was not significantly different from Nebraska but was significantly different from Kansas, Ohio, and South Dakota (see Table 49).

Table 49. Tukey Test Results for the % of Total Expenditures Spent on Other Expenses by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	1.000	1.000										
IN	0.035	0.007	1.000									
KS	0.886	0.298	0.000	1.000								
MI	0.001	0.000	0.000	0.149	1.000							
MN	0.000	0.000	0.000	0.000	0.514	1.000						
MO	0.033	0.009	1.000	0.000	0.000	0.000	1.000					
ND	0.017	0.009	0.996	0.000	0.000	0.000	0.999	1.000				
NE	0.781	0.427	0.000	1.000	0.987	0.254	0.000	0.000	1.000			
OH	0.440	0.010	0.000	1.000	0.288	0.000	0.000	0.000	1.000	1.000		
SD	1.000	1.000	0.472	0.999	0.376	0.019	0.419	0.181	0.984	0.985	1.000	
WI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Amount Spent on Instruction per Student (EINS)

NCES (2005) considers expenditures on instruction to be a "functional expense category that includes expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public service that are not separately budgeted" and FTE students to be "equal to one student enrolled full time for one academic year." Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The overall mean of the amount spent on instruction per student by state ranged from $3,299 in Illinois to $8,894 in Wisconsin (see rightmost column, Table 50). The weighted mean by year ranged from $4,208 to $4,928 with a 3.1% increase in the amount spent on instruction per student over the 10-year period (see bottom row, Table 50).

Table 50. Mean Amount Spent on Instruction per Student by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
WI	18	8,381	8,642	8,660	8,783	9,227	9,316	8,998	8,281	9,365	9,284	8,894
ND	7	9,049	8,606	4,181	6,282	5,695	6,504	3,666	4,465	6,250	3,912	5,861
IA	16	5,718	5,544	5,455	5,681	5,590	5,782	5,718		4,566	4,829	5,431
NE	8	3,814	3,651	4,068	4,393	4,677	4,534	4,489	8,303	4,755	5,424	4,811
MN	30	4,177	5,114	4,216	4,886	4,931	4,723	4,748		4,478	4,773	4,672
KS	29	3,797	4,470	4,363	4,119	4,428	4,837	4,558	3,910	3,611	4,659	4,275
MO	24	3,345	3,200	3,423	3,806	3,753	6,468	6,000	4,060	3,990	4,533	4,258
MI	31	4,186	4,183	4,304	4,238	4,387	4,430	4,181	3,803	4,135	3,886	4,173
SD	5	3,016		4,587	3,879	3,962	4,574	4,013	3,678	4,421	3,855	3,998
OH	38	3,985	3,956	3,913	4,088	4,064	4,142	3,972	3,794	3,812	3,773	3,950
IN	16	3,755	4,145	4,038	4,139	4,268	3,965	3,868	3,873	3,572	3,490	3,911
IL	49	3,368	3,271	3,127	3,251	3,337	3,577	3,526	2,998	3,101	3,433	3,299
Weighted Mean		4,329	4,512	4,292	4,491	4,580	4,928	4,682	4,208	4,290	4,463	

The mean of the amount spent on instruction per student by educational orientation was $4,670 for Applied Sciences-oriented institutions and $3,949 for Arts and Sciences-oriented institutions, an 18.3% difference (see rightmost column, Table 51).

Table 51. Mean Amount Spent on Instruction per Student by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	4,498	4,529	4,582	4,697	4,842	5,204	4,958	4,137	4,523	4,731	4,670
A&S	67	4,201	4,736	3,673	4,081	4,063	3,990	3,812	3,442	3,771	3,720	3,949

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Illinois and Wisconsin were significantly different from other states; Indiana, Michigan, Ohio, and South Dakota were not significantly different from each other, but each was significantly different from the following groups of states that were not significantly different from each other but were significantly from one another: Iowa and North Dakota, and Minnesota, Missouri, and Nebraska. Also, Kansas was not significantly different from Michigan although it was significantly different from Indiana, Ohio, and South Dakota (see Table 52).

Table 52. Tukey Test Results for the Amount Spent on Instruction per Student by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.000	1.000										
IN	0.000	0.051	1.000									
KS	0.000	0.000	0.498	1.000								
MI	0.000	0.000	0.922	0.999	1.000							
MN	0.008	0.000	0.005	0.839	0.167	1.000						
MO	0.001	0.000	0.449	1.000	0.993	0.993	1.000					
ND	0.938	0.000	0.000	0.000	0.000	0.001	0.000	1.000				
NE	0.050	0.000	0.608	1.000	0.993	1.000	1.000	0.003	1.000			
OH	0.000	0.000	1.000	0.350	0.892	0.000	0.359	0.000	0.594	1.000		
SD	0.006	0.381	1.000	1.000	1.000	0.832	0.998	0.000	0.996	1.000	1.000	
WI	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000

Amount Spent on Academic Support per Student (EASS)

NCES (2005) considers expenditures on academic support to be a "functional expense category that includes expenses of activities and services that support the institution's primary missions of instruction, research, and public service" and FTE students to be "equal to one student enrolled full time for one academic year." Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The overall mean of the amount spent on academic support per student by state ranged from $502 in Illinois to $1,543 in Nebraska (see rightmost column, Table 53). The weighted mean by year ranged from $670 to $923 with a 15.4% increase in the amount spent on academic support per student over the 10-year period (see bottom row, Table 53).

The mean of the amount spent on academic support per student by educational orientation was $802 for Applied Sciences-oriented institutions and $795 for Arts and Sciences-oriented institutions, a 0.9% difference (see rightmost column, Table 54).

Table 53. Mean Amount Spent on Academic Support per Student by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
NE	8	1,258	1,132	1,307	1,489	1,511	1,458	1,477	2,903	1,499	1,394	1,543
MI	31	1,289	1,358	1,443	1,443	1,588	1,602	1,515	1,690	1,579	1,316	1,482
MN	30	725	818	1,024	1,235	1,271	1,240	1,280		1,089	1,125	1,090
SD	5	829		544	1,043	1,049	1,124	896	635	640	1,024	865
OH	38	673	749	792	818	828	866	835	785	793	761	790
ND	7	873	764	549	556	559	712	892	669	813	609	700
KS	29	555	644	697	708	672	662	623	1,219	631	583	699
IA	16	671	610	625	709	641	682	662		709	649	662
MO	24	436	472	595	657	653	818	664	642	653	640	623
IN	16	603	637	622	669	701	626	632	512	442	439	588
WI	18	438	465	488	486	609	614	674	539	590	671	557
IL	49	393	449	468	522	553	596	604	526	423	483	502
Weighted Mean		670	714	770	836	866	893	871	923	798	773	

Table 54. Mean Amount Spent on Academic Support per Student by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	680	714	764	846	877	904	896	727	815	797	802
A&S	67	678	752	796	858	878	885	846	755	789	719	795

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD procedure. Iowa, Indiana, Kansas, Missouri, and North Dakota were not significantly different from each other, but each was significantly different from Michigan and Nebraska, which were not significantly different from each other. Also, Ohio and South Dakota were not significantly different from North Dakota but were significantly different from Iowa, Indiana, Kansas, and Missouri. Wisconsin and Illinois were not significantly different from one another; Wisconsin was also not significantly different from Indiana and Missouri, although it was significantly different from Iowa, Kansas, and North Dakota (see Table 55).

Table 55. Tukey Test Results for the Amount Spent on Academic Support per Student by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.007	1.000										
IN	0.945	0.631	1.000									
KS	1.000	0.004	0.977	1.000								
MI	0.000	0.000	0.000	0.000	1.000							
MN	0.000	0.000	0.000	0.000	0.000	1.000						
MO	1.000	0.145	1.000	1.000	0.000	0.000	1.000					
ND	1.000	0.038	0.804	0.998	0.000	0.000	0.991	1.000				
NE	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	1.000			
OH	0.128	0.000	0.000	0.012	0.000	0.000	0.025	0.991	0.000	1.000		
SD	0.155	0.000	0.008	0.075	0.000	0.256	0.061	0.747	0.000	0.968	1.000	
WI	0.668	0.930	1.000	0.748	0.000	0.000	0.977	0.534	0.000	0.000	0.002	1.000

Amount Spent on Student Services per Student (ESSS)

NCES (2005) considers expenditures on student services to be a "functional expense category that includes expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program" and FTE students to be "equal to one student enrolled full time for one academic year." Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The overall mean of the amount spent on student services per student by state ranged from $593 in Indiana to $1,550 in Michigan (see rightmost column, Table 56). The weighted mean by year ranged from $891 to $1,095 with an 18.7% increase in the percentage of amount spent on student services per student over the 10-year period (see bottom row, Table 56).

Table 56. Mean Amount Spent on Student Services per Student by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
MI	31	1,271	1,302	1,237	1,511	1,657	1,724	1,607	1,386	1,915	1,885	1,550
WI	18	1,275	1,311	1,377	1,369	1,470	1,518	1,471	1,477	1,605	1,575	1,445
MN	30	1,124	1,511	1,362	1,614	1,509	1,457	1,470		1,318	1,436	1,422
KS	29	858	860	874	975	1,049	1,078	1,037	1,059	1,219	986	1,000
OH	38	874	896	902	940	947	1,016	900	936	871	855	914
ND	7	929	646	499	1,276	1,330	735	753	710	1,017	1,055	895
MO	24	646	670	650	671	771	998	790	1,189	689	738	781
IL	49	734	739	700	772	818	869	817	713	767	832	776
IA	16	710	699	697	766	752	820	793		700	751	743
SD	5	570		564	550	572	649	551	791	905	642	644
NE	8	665	535	599	1,035	468	596	623	247	663	869	630
IN	16	608	693	658	668	657	602	576	511	477	483	593
Weighted Mean		891	946	909	1,036	1,058	1,095	1,028	971	1,056	1,058	

The mean of the amount spent on student services per student by educational orientation was $1,024 for Applied Sciences-oriented institutions and $940 for Arts and Sciences-oriented institutions, an 8.9% difference (see rightmost column, Table 57).

Table 57. Mean Amount Spent on Student Services per Student by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	911	993	955	1,079	1,089	1,144	1,077	837	1,073	1,084	1,024
A&S	67	908	800	819	975	1,032	993	938	850	1,037	1,051	940

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Michigan was significantly different from other states; Iowa, Illinois, Missouri, North Dakota, Nebraska, and South Dakota were not significantly different from each other, but each was significantly different from Minnesota and Wisconsin, which were not significantly different from each other. Also, Indiana was not significantly different from Nebraska and South Dakota but was significantly different from Iowa, Illinois, Missouri, and North Dakota. Kansas and Ohio, which were not significantly different from each other or from North Dakota but were significantly different from Iowa, Illinois, Missouri, Nebraska, and South Dakota (see Table 58).

Table 58. Tukey Test Results for the Amount Spent on Student Services per Student by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	1.000	1.000										
IN	0.359	0.007	1.000									
KS	0.001	0.000	0.000	1.000								
MI	0.000	0.000	0.000	0.000	1.000							
MN	0.000	0.000	0.000	0.000	0.062	1.000						
MO	1.000	1.000	0.315	0.005	0.000	0.000	1.000					
ND	0.792	0.928	0.011	0.992	0.000	0.000	0.875	1.000				
NE	0.999	0.925	0.997	0.002	0.000	0.000	0.998	0.451	1.000			
OH	0.053	0.024	0.000	0.916	0.000	0.000	0.141	1.000	0.034	1.000		
SD	0.995	0.911	1.000	0.010	0.000	0.000	0.991	0.458	1.000	0.096	1.000	
WI	0.000	0.000	0.000	0.000	0.358	1.000	0.000	0.000	0.000	0.000	0.000	1.000

Amount Spent on Institutional Support per Student (EISS)

NCES (2005) considers expenditures on institutional support to be a "functional expense category that includes expenses for the day-to-day operational support of the institution" and FTE students to be "equal to one student enrolled full time for one academic year." Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The overall mean of the amount spent on institutional support per student by state ranged from $1,140 in Missouri to $1,818 in Illinois (see rightmost column, Table 59). The weighted mean by year ranged from $1,382 to $1,597 with an 11.5% increase in the amount spent on institutional support per student over the 10-year period (see bottom row, Table 59).

The mean of the amount spent on institutional support per student by educational orientation was $1,504 for Applied Sciences-oriented institutions and $1,453 for Arts and Sciences-oriented institutions, a 3.5% difference (see rightmost column, Table 60).

Table 59. Mean Amount Spent on Institutional Support per Student by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
IL	49	1,496	1,622	1,652	1,762	2,016	2,152	2,041	1,955	1,452	2,036	1,818
WI	18	1,540	1,613	1,736	1,708	1,874	1,946	1,857	1,358	2,007	2,075	1,771
IA	16	1,553	1,472	1,512	1,709	1,679	1,844	1,729		1,540	1,801	1,649
NE	8	1,712	1,320	1,516	1,711	1,392	1,425	1,434		1,408	1,972	1,543
MI	31	1,179	1,223	1,261	1,401	1,464	1,532	1,513	1,566	1,423	1,594	1,416
KS	29	1,308	1,318	1,332	1,460	1,571	1,474	1,349	1,376	1,430	1,403	1,402
OH	38	1,315	1,363	1,363	1,405	1,420	1,483	1,432	1,399	1,382	1,413	1,398
MN	30	1,324	1,298	1,549	1,670	1,501	1,251	1,166		1,062	1,150	1,330
ND	7	1,523	1,947	930	1,214	1,002	1,087	1,326	1,054	1,847	1,367	1,330
IN	16	1,334	1,461	1,438	1,408	1,416	1,394	1,327	1,221	1,090	1,017	1,310
SD	5	2,425		1,010	1,184	1,147	1,208	1,157	978	1,315	1,194	1,291
MO	24	1,105	980	964	1,067	996	1,307	1,150	1,647	1,111	1,072	1,140
Weighted Mean		1,382	1,391	1,410	1,513	1,549	1,597	1,520	1,535	1,390	1,541	

Table 60. Mean Amount Spent on Institutional Support per Student by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	1,402	1,405	1,485	1,576	1,617	1,647	1,560	1,386	1,407	1,552	1,504
A&S	67	1,312	1,441	1,301	1,412	1,476	1,496	1,427	1,688	1,369	1,603	1,453

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. Indiana, Kansas, Michigan, Minnesota, North Dakota, Ohio, and South Dakota were not significantly different from each other, but each was significantly from the following groups of states that were not significantly different from each other although these groups were significantly different from one another: Iowa and Nebraska, and Illinois and Wisconsin. Also, Missouri was not significantly different from South Dakota but it was significantly different from Indiana, Kansas, Michigan, Minnesota, North Dakota, and Ohio (see Table 61).

Table 61. Tukey Test Results for the Amount Spent on Institutional Support per Student by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.407	1.000										
IN	0.001	0.000	1.000									
KS	0.046	0.000	0.971	1.000								
MI	0.025	0.000	0.963	1.000	1.000							
MN	0.000	0.000	1.000	0.986	0.979	1.000						
MO	0.000	0.000	0.357	0.005	0.002	0.105	1.000					
ND	0.239	0.000	1.000	1.000	1.000	1.000	0.487	1.000				
NE	0.999	0.182	0.399	0.940	0.923	0.431	0.001	0.929	1.000			
OH	0.011	0.000	0.969	1.000	1.000	0.983	0.002	1.000	0.887	1.000		
SD	0.012	0.000	0.999	0.828	0.817	0.993	1.000	0.993	0.287	0.831	1.000	
WI	0.667	1.000	0.000	0.000	0.000	0.000	0.000	0.002	0.307	0.000	0.000	1.000

Amount Spent on Other Expenses per Student (EOES)

Expenditures on other expenses were considered to be all other institutional expenditures including those on research, public service, operation maintenance of plant, depreciation, scholarships and fellowships expenses, other expenses and deductions, total nonoperating expenses and deductions and NCES (2005) considers FTE students to be "equal to one student enrolled full time for one academic year." Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The overall mean of the amount spent on other expenses per student by state ranged from $3,231 in Kansas to $6,460 in North Dakota (see rightmost column, Table 62). The weighted mean by year ranged from $3,119 to $3,900 with a 21.7% increase in the amount spent on other expenses per student over the 10-year period (see bottom row, Table 62).

The mean of the amount spent on other expenses per student by educational orientation was $3,525 for Applied Sciences-oriented institutions and $3,490 for Arts and Sciences-oriented institutions, a 1.0% difference (see rightmost column, Table 63).

Table 62. Mean Amount Spent on Other Expenses per Student by State and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
ND	7	4,183	3,918	3,912	13,180	10,671	9,151	4,722	3,675	4,505	6,685	6,460
IA	16	3,917	4,103	3,763	4,019	3,954	4,334	4,313		4,455	4,530	4,154
MO	24	3,022	3,039	3,411	3,477	4,159	5,013	3,791	5,680	3,354	4,550	3,950
IN	16	3,861	3,972	4,002	4,100	4,511	3,951	3,751	3,146	3,048	3,318	3,766
NE	8	2,778	2,752	3,419	3,893	3,730	3,768	3,729		3,424	4,790	3,587
MI	31	3,341	3,291	3,274	3,565	3,753	3,805	4,076	3,458	3,502	3,612	3,568
MN	30	2,856	3,613	3,674	5,030	3,407	3,201	3,396		3,300	3,366	3,538
SD	5	4,183		3,511	4,106	4,137	4,301	4,178	1,114	2,905	2,091	3,392
OH	38	3,209	3,409	3,432	3,099	3,362	3,322	3,323	3,399	3,160	3,202	3,292
WI	18	2,634	2,648	2,589	2,652	2,978	3,659	3,447	3,847	4,005	4,328	3,279
IL	49	2,625	2,737	2,794	2,973	3,268	3,660	3,936	3,056	3,372	3,927	3,235
KS	29	3,060	3,140	2,954	3,060	3,337	3,544	3,280	3,264	3,442	3,226	3,231
Weighted Mean		3,119	3,249	3,283	3,759	3,754	3,900	3,721	3,539	3,464	3,797	

Table 63. Mean Amount Spent on Other Expenses per Student by Educational Orientation and Year

	Number of Institutions	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Mean
AS	204	3,189	3,244	3,324	3,571	3,601	3,978	3,768	3,347	3,493	3,735	3,525
A&S	67	2,882	3,281	3,089	4,225	3,986	3,464	3,588	3,072	3,400	3,915	3,490

Tests of main effects for the state and year factors were conducted using analysis of variance and the Tukey HSD multiple comparison procedure. North Dakota was significantly different from other states; Illinois, Kansas, Michigan, Minnesota, Nebraska, Ohio, South Dakota, and Wisconsin were not significantly different from each other. Iowa was not significantly different from Indiana, Missouri, Nebraska, and South Dakota but was significantly different from the other states. Also, Indiana was not significantly different from any states other than Kansas, Ohio, and Wisconsin; Missouri was not significantly different from any states other than Illinois, Kansas, Ohio, and Wisconsin (see Table 64).

Table 64. Tukey Test Results for the Amount Spent on Other Expenses per Student by State

	IA	IL	IN	KS	MI	MN	MO	ND	NE	OH	SD	WI
IA	1.000											
IL	0.002	1.000										
IN	0.928	0.430	1.000									
KS	0.006	1.000	0.533	1.000								
MI	0.351	0.748	1.000	0.838	1.000							
MN	0.253	0.897	0.999	0.933	1.000	1.000						
MO	0.994	0.259	1.000	0.346	0.995	0.982	1.000					
ND	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000				
NE	0.910	0.987	1.000	0.985	1.000	1.000	1.000	0.000	1.000			
OH	0.005	1.000	0.608	1.000	0.900	0.971	0.403	0.000	0.995	1.000		
SD	0.831	1.000	1.000	1.000	1.000	1.000	0.998	0.000	1.000	1.000	1.000	
WI	0.015	1.000	0.647	1.000	0.911	0.968	0.451	0.000	0.991	1.000	1.000	1.000

Research Question 8

For Research Question 8, regression analysis was used to ascertain whether in the 2003-2004 fiscal year the expenditure structure of public 2-year institutions alone was able to predict first-year retention rates. The null hypothesis was that the expenditure structure was not able to predict first-year retention rates.

The data for first-year retention rates (RETR), the percentages spent on instruction (EIN%), academic support (EAS%), student services (ESS%), institutional support (EIS%), and other expenses (EOE%) were gathered and the data set was analyzed for missing data and outliers before the multiple regression analysis occurred. The following equation was tested:

$$RETR = \beta_0 + \beta_1 EIN\% + \beta_2 EAS\% + \beta_3 ESS\% + \beta_4 EIS\% + \beta_5 EOE\%$$

The model was checked for multicollinearity, which indicates a high intercorrelation between the independent variables. With a VIF of 1.183, multicollinearity was not considered to be a problem.

A standardized regression coefficient was determined for each of the independent variables to measure the amount of influence of that indicator on the dependent variables (see

Appendix C). Next, a *t*-test was conducted on each of the standardized regression coefficients for the independent variables using Type I error level of $\alpha \leq .05$. When the *t*-test was conducted, it was found that the null hypothesis could not be rejected. Additionally, the *F*-test was conducted with Type I error level $\alpha \leq .05$ determined the level of linearity between the independent and dependent variables. When the *F*-test was conducted, it also was found that the null hypothesis could not be rejected. Thus, it appears that, in the 2003-2004 fiscal year, the expenditure structure of public 2-year institutions alone could not be determined to predict first-year retention rates.

When the questions again were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institutions, it was also found that, in the 2003-2004 fiscal year, the expenditure structure of public 2-year institutions alone could not be determined to predict first-year retention rates for the individual types of institutions.

Overall, no relationship could be determined between the expenditure structure and first year retention rates for public 2-year institutions in general or specifically for Arts and Sciences-oriented or Applied Sciences-oriented institutions.

Research Question 9

Research Question 9 used regression analysis to ascertain whether or not, in the 2003-2004 fiscal year, the expenditure patterns of public 2-year institutions alone were able to predict first-year retention rates. The null hypothesis was that the expenditure patterns were not able to predict first-year retention rates.

Variables measuring first-year retention rates (RETR), the amounts spent per student for instruction (EINS), academic support (EASS), student services (ESSS), institutional

support (EISS), and other expenses (EOES) were assessed for missing data and outliers prior to multiple regression analysis. The following equation was tested:

$$RETR = \beta_0 + \beta_1 EINS + \beta_2 EASS + \beta_3 ESSS + \beta_4 EISS + \beta_5 EOES$$

Data from years other than 2003-2004 was transformed into current dollars using the Consumer Price Index (CPI). The Consumer Price Index was gathered for each month within the study and the annual data was transformed using the average index for all of the months within that fiscal year.

The variables were tested for multicollinearity, which indicates a high intercorrelation between the independent variables. With a VIF of 1.000, multicollinearity was not considered to be a problem.

A standardized regression coefficient was determined for the independent variables, which measured the amount of influence of that indicator on the dependent variables (see Appendix C) resulting in the following equation:

$$RETR = 52.162 + .001EINS$$

In other words, the amount spent on instruction per student appears to have a positive effect on first-year retention rates. (EASS, ESSS, EISS, and EOES were excluded variables since they had no effect on the equation.)

A *t*-test was conducted on each of the standardized regression's coefficients for the independent variables using Type I error level of $\alpha \leq .05$ led to rejection of the null hypothesis. Additionally, the *F*-test, conducted with Type I error level $\alpha \leq .05$, determined that the null hypothesis of linearity between the independent and dependent variables could be rejected. The coefficient of determination (R^2) identified the proportion of the variance in

the dependent variable that could be explained by the independent variables, and the value was .092.

When the questions again were tested individually by Arts and Sciences-oriented and Applied Sciences-oriented institutions, the following relationship was found:

Applied Sciences-Oriented

$$RETR = 51.996 + .002EINS \qquad R^2 = .103$$

No relationship was found between revenue patterns and first-year retention rates for Arts and Sciences-oriented institutions. For Applied Sciences-oriented institutions, there was a positive relationship found between the amounts spent on instruction per student and the first-year retention rates which accounted for 10.3% of the variability in first-year retention rates.

Summary

It was the intended goal of this study to obtain an understanding of how an institution's characteristics and revenue and expenditure structures/patterns impact student retention rates in an effort to assist organizations in their configuration of resources to improve these rates. This quantitative study was conducted on the bases of the theoretical framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence to obtain an understanding of how the institutional characteristics impact student retention rates at public 2-year institutions. The data for all of the variables was provided by the Integrated Postsecondary Education Data System (IPEDS) and multiple regression analysis was used to analyze the data.

CHAPTER 5. CONCLUSIONS

Overview

The purpose of this study was to understand the relationship between the public 2-year educational institutions' institutional characteristics and first-year retention rates within the framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence. Additionally, this study was intended to obtain an understanding of how an institution's characteristics and revenue and expenditure structures/patterns impact student retention rates in an effort to assist organizations in their configuration of resources to improve these rates. There were relationships that were found to exist between institutional characteristics, and the revenue and expenditure structures/patterns as well as relationships found that had both direct and indirect impacts on retention rates for public 2-year institutions.

Summary and Discussion

There were nine research questions that were studied to obtain an understanding of these relationships.

Research Question 1

In the 2003-2004 fiscal year, were the general institutional characteristics of public 2-year institutions alone able to predict first-year retention rates?

It could not be determined that the general institutional characteristics of the ratio of FTE students to full-time faculty, the percentage of total full-time employees who are faculty and institutional grant aid as a percentage of tuition and fee income were able to predict the first-year retention rates at public 2-year institutions.

Research Question 2

Between 1994-1995 and 2003-2004, were the general institutional characteristics of public 2-year institutions able to predict the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses?

There were several relationships found between the general institutional characteristics and the expenditure structure of public 2-year institutions and the Table 65 shows the effects:

Table 65. Results from Analysis of Question 2

	Effect From								
	Ratio of FTE Students to FT Faculty			% of FT Employees who are Faculty			Grant Aid as % of Tuition & Fees		
	Overall	A & S	Applied	Overall	A & S	Applied	Overall	A & S	Applied
Percentages Spent on:									
Instruction	-0.001	-0.001	-0.002	0.321	---	0.383	-0.033	-0.069	-0.024
Academic Support	---	---	---	---	0.082	---	---	-0.014	---
Student Services	---	---	---	---	0.078	---	---	---	---
Institutional Support	0.001	0.001	0.001	-0.098	-0.094	-0.100	---	---	---
Other Expenses	---	---	---	-0.245	-0.165	-0.264	0.040	0.067	0.033

When all institutions were tested together, there was a slightly negative relationship between the ratio of FTE students to full-time faculty and the percentage of total expenditures spent on instruction and a slightly positive relationship between the percentage of total expenditures spent on institutional support. The percentage of total full-time employees who are faculty had a positive relationship with the percentage of total expenditures spent on instruction and negative effects on the percentage of total expenditures spent on both institutional support and other expenses. Grant aid as a percentage of tuition and fee income had a negative effect on the percentage spent on instruction and a positive effect on the percentage spent on other expenses. To summarize, when all institutions were tested together:

- *as the ratio of full-time equivalent students to full-time faculty increased, there was a slight decrease in the amount of total expenditures spent on instruction and a slight increase in the amount of total expenditures spent on institutional support,*
- *as the percentage of total full-time employees who are faculty increased, there was an increase on the percentage of total expenditures spent on instruction and decreases on the percentages of total expenditures spent on institutional support and other expenses, and*
- *as the grant aid as a percentage of tuition and fee income increased, there was a decrease in the percentage of total expenditures spent on instruction and an increase in the percentage of total expenditures spent on other expenses.*

The institutions were separated by educational orientation and, although the effect of the usage of adjunct faculty within the different institutions was not measured and may have caused some of the differences, there were differences that were found to exist. It was found that, for all items within the expenditure structure, the ratio of FTE students to full-time faculty had either a slight or no effect on the expenditure structure.

Also, when institutions were tested by educational orientation for the percentage of total expenditures spent on instruction, stronger negative relationships were found to exist in Applied Sciences-oriented institutions than in Arts and Sciences-oriented institutions for the percentages spent on both institutional support and other expenses. There was a positive effect from the percentage of full-time employees who are faculty for both Applied Sciences-

oriented institutions (on the percentage spent on instruction) and for Arts and Sciences-oriented institutions (on academic support and student services).

Finally, grant aid as a percentage of tuition and fee income had negative effects on the percentages spent on instruction for both types of institutions as well as a negative effect on the percentage spent academic support for Arts and Sciences-oriented institutions. Grant aid as a percentage of tuition and fee income had positive effects on both types of institutions on the percentages spent on other expenses. In all cases, the effects were stronger in the Arts and Sciences-oriented institutions than in the Applied Sciences-oriented institutions.

To summarize, when Arts and Sciences-oriented institutions were tested:

- *as the ratio of full-time equivalent students to full-time faculty increased, there was a slight decrease in the amount of total expenditures spent on institutional support and a slight increase in the amount of total expenditures spent on instruction,*
- *as the percentage of total full-time employees who are faculty increased, there were increases on the percentages of total expenditures spent on academic support and student services and decreases on the percentages of total expenditures spent on institutional support and other expenses, and*
- *as the grant aid as a percentage of tuition and fee income increased, there were decreases in the percentages of total expenditures spent on instruction and academic support and an increase in the percentage of total expenditures spent on other expenses.*

When Applied Sciences-oriented institutions were tested:

- *as the ratio of full-time equivalent students to full-time faculty increased, there was a slight decrease in the amount of total expenditures spent on institutional support and a slight increase in the amount of total expenditures spent on instruction,*
- *as the percentage of total full-time employees who are faculty increased, there was an increase on the percentage of total expenditures spent on instruction and decreases on the percentages of total expenditures spent on institutional support and other expenses, and*
- *as the grant aid as a percentage of tuition and fee income increased, there was a decrease in the percentage of total expenditures spent on instruction and an increase in the percentage of total expenditures spent on other expenses.*

Overall, there were several relationships found between the general institutional characteristics and the expenditure structure of public 2-year institutions although there was very little effect that was found from the ratio of FTE students to full-time faculty and the effects from the percentage of full-time employees who are faculty, when found to exist, were stronger in Applied Sciences-oriented institutions whereas grant aid as a percentage of tuition and fee income had a stronger effect on Arts and Sciences-oriented institutions.

Research Question 3

Between 1994-1995 and 2003-2004, were the general institutional characteristics of public 2-year institutions able to predict the amount spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?

There were several relationships found between the general institutional characteristics and the expenditure patterns of public 2-year institutions and the Table 66 shows the effects:

Table 66. Results from Analysis of Question 3

	Effect From								
	Ratio of FTE Students to FT Faculty			% of FT Employees who are Faculty			Grant Aid as % of Tuition & Fees		
	Overall	A & S	Applied	Overall	A & S	Applied	Overall	A & S	Applied
Amount per FTE on:									
Instruction	-93.954	-64.062	-100.891	-472.496	-2,517.476	-385.089	---	-542.357	---
Academic Support	-7.531	-8.007	-7.886	-508.817	---	-773.556	---	---	---
Student Services	-13.797	-12.885	-13.634	-845.689	---	-1,185.883	---	---	-92.346
Institutional Support	-14.591	---	-15.966	-2,626.640	-1,892.530	-2,737.058	---	231.292	---
Other Expenses	-55.535	-43.095	-55.396	-6,052.382	-4,566.201	-6,384.637	421.005	1,072.307	280.799

(Note that these results are indicative of the change of 1 or 100% in general institutional characteristic. The results of a 1% change in general institutional characteristic could be established by dividing each of the results in Table 66 by 100.)

When all institutions were tested together, both the ratio of FTE students to full-time faculty and the percentage of full-time employees who are faculty had negative relationships on all of the expenditure patterns per student (the amounts spent on instruction, academic support, student services, institutional support, and other expenses). Grant aid as a percentage of tuition and fee income was found to have a positive effect on the amount spent on other expenses per student. To summarize, when all institutions were tested together:

- *as the ratio of full-time equivalent students to full-time faculty increased, there were decreases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses,*
- *as the percentage of total full-time employees who are faculty increased, there were decreases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses, and*

- *as the grant aid as a percentage of tuition and fee income increased, there was an increase in the amount spent per student on other expenses.*

When institutions were tested by educational orientation it was found that, although spending per FTE for academic support was effected equally by the ratio of FTE students to full-time faculty, this ratio had stronger effects on Applied Sciences-oriented institutions than on Arts and Sciences-oriented institutions for all other types of spending per FTE: instruction, student services, institutional support, and other expenses. In all cases, the ratio of FTE students to full-time faculty had negative effects on the expenditure patterns of public 2-year institutions.

Also, when institutions were tested by educational orientation it was found that the percentage of total full-time employees who are faculty had a stronger negative effect on the spending per FTE on instruction for Arts and Sciences-oriented institutions than on Applied Sciences-oriented institutions. For every other type of expenditure pattern (academic support, student services, institutional support, and other expenses), there were stronger effects felt from the percentage of full-time employees who are faculty on Applied Sciences-oriented institutions that on Arts and Sciences-oriented institutions. All effects from the percentage of full-time employees who are faculty to the expenditure patterns were negative.

Finally, there was in increase in spending for other expenditures per FTE as grant aid as a percentage of tuition and fee income increased for both types of institutions as well as an increase in spending for institutional support for Arts and Sciences-oriented institutions as grant aid as a percentage of tuition and fee income increased. There were negative relationships between the spending on instruction for Arts and Sciences-oriented

institutions and the spending for student services for Applied Sciences-oriented institutions from grant aid as a percentage of tuition and fee income.

To summarize, when Arts and Sciences-oriented institutions were tested:

- *as the ratio of full-time equivalent students to full-time faculty increased, there were decreases in the amounts spent per student on instruction, academic support, student services, and other expenses,*
- *as the percentage of total full-time employees who are faculty increased, there were decreases in the amounts spent per student on instruction, institutional support, and other expenses, and*
- *as the grant aid as a percentage of tuition and fee income increased, there was a decrease in the amount spent per student on instruction and increases in the amounts spent per student on institutional support and other expenses.*

When Applied Sciences-oriented institutions were tested:

- *as the ratio of full-time equivalent students to full-time faculty increased, there were decreases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses,*
- *as the percentage of total full-time employees who are faculty increased, there were decreases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses, and*
- *as the grant aid as a percentage of tuition and fee income increased, there was a decrease in the amount spent per student on student services and an increase in the amount spent per student on other expenses.*

Overall, all of the spending patterns were affected in some way by the general institutional characteristics of public 2-year institutions although, in most cases, the ratio for FTE students to full-time faculty had stronger effects on the amounts spent per student at Applied Sciences-oriented institutions than at Arts and Sciences-oriented institutions.

Research Question 4

Between 1994-1995 and 2003-2004, were the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions able to predict the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?

There were several relationships found between the revenue structure and the expenditure structure of public 2-year institutions and the Table 67 shows the effects:

Table 67. Results from Analysis of Question 4

	Effect From								
	% from Tuition & Fees			% from Non-Federal Approp.			% from All Other Revenues		
	Overall	A & S	Applied	Overall	A & S	Applied	Overall	A & S	Applied
Amount per FTE on:									
Instruction	---	0.319	-0.080	---	---	---	-0.232	---	-0.281
Academic Support	0.087	0.051	0.093	---	---	---	-0.022	-0.093	---
Student Services	---	---	---	---	---	---	-0.042	-0.067	-0.037
Institutional Support	-0.055	-0.172	-0.029	---	---	---	0.039	---	0.052
Other Expenses	---	-0.176	---	---	---	---	0.263	0.190	0.270

When all institutions were tested together, the percentage of revenue received from tuition and fees had a positive effect on the percentage of total expenditures spent on academic support and a negative effect on the percentage of total expenditures spent on institutional support. The percentage of total revenues received from non-federal government appropriations was found to have no effect on the expenditure structure of public 2-year institutions (when tested both for all institutions and by educational orientation). The

percentage of total revenues received from other sources had negative effects on the percentage of total expenditures spent on instruction, academic support, and student services and positive effects on the percentage of total expenditures spent on institutional support and other expenses. To summarize, when all institutions were tested together:

- *as the percentage of revenue received from tuition and fees increased, there was an increase in the amount of total expenditures spent on academic support and a decrease in the amount of total expenditures spent on institutional support,*
- *the percentage of revenue received from non-federal appropriations did not have an effect on the expenditure structure, and*
- *as the percentage of total revenue received from other revenues increased, there were decreases in the percentages of total expenditures spent on instruction, academic support, and student services and increases in the percentages of total expenditures spent on institutional support and other expenses.*

When institutions were tested by educational orientation, it was found that for the percentage of revenue received from tuition and fees there was a stronger positive effect in the Applied Sciences-oriented institutions than in the Arts and Sciences-oriented institutions for the percentage of total expenditures spent on academic support. There was a stronger negative effect on Arts and Sciences-oriented institutions than on Applied Sciences-oriented institutions for the percentage of total expenditures spent on institutional support. The percentage of revenue received from tuition and fees was also found to have a positive effect on the percentage of total expenditures spent on instruction for Arts and Sciences-oriented

institutions and a negative effect for Applied Sciences-oriented institutions. Finally, the percentage of revenue received from tuition and fees was found to have a negative effect on the percentage spent on other expenses for Arts and Sciences-oriented institutions only.

Also, when institutions were tested by educational orientation, it was found that for the percentage of revenue received from other sources had stronger effects in the Applied Sciences-oriented institutions than in institutions overall for the percentage of total expenditures spent on instruction (negative relationship–no relationship could be established for Arts and Sciences-oriented institutions), the percentage spent on institutional support (positive relationship–no relationship could be established for Arts and Sciences-oriented institutions), and the percentage spent on other expenses (positive relationship) . There were stronger effects in Arts and Sciences-oriented institutions than in institutions overall for the percentage of total expenditures spent on academic support (negative relationship–no relationship could be established for Applied Sciences-oriented institutions) and the percentage spent on student services (negative relationship).

To summarize, when Arts and Sciences-oriented institutions were tested:

- *as the percentage of revenue received from tuition and fees increased, there were increases in the amounts of total expenditures spent on instruction and academic support and decreases in the amounts of total expenditures spent on institutional support and other expenses,*
- *the percentage of revenue received from non-federal appropriations did not have an effect on the expenditure structure, and*
- *as the percentage of total revenue received from other revenues increased, there were decreases in the percentages of total expenditures spent on*

academic support and student services and an increase in the percentage of total expenditures spent on other expenses.

When Applied Sciences-oriented institutions were tested:

- *as the percentage of revenue received from tuition and fees increased, there were decreases in the amounts of total expenditures spent on instruction and institutional support and an increase in the amount of total expenditures spent on academic support,*
- *the percentage of revenue received from non-federal appropriations did not have an effect on the expenditure structure, and*
- *as the percentage of total revenue received from other revenues increased, there were decreases in the percentages of total expenditures spent on instruction and student services and increases in the percentages of total expenditures spent on institutional support and other expenses.*

Overall, there were several relationships found between the revenue structure and the expenditure structure of public 2-year institutions. For Arts and Sciences-oriented institutions, there were stronger effects felt from the percentage of revenue received from tuition and fees on percentages spent on institutional support and other expenses and from the percentage of revenue received from other sources on the percentages spent on academic support and student services. For Applied Sciences-oriented institutions, there were stronger effects felt from the percentage of revenue received from tuition and fees on percentages spent on academic support and from the percentage of revenue received from other sources on the percentages spent on instruction, institutional support, and other expenses. No

relationship could be found between the percentage of revenues received from non-federal government appropriations and the expenditure structure.

Research Question 5

In the 2003-2004 fiscal year, were the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions alone able to predict first-year retention rates?

It could not be determined that the revenue structure (the dollar amounts received as a percentage of total revenue for tuition and fees, non-federal government appropriations, and all other sources of revenue) at public-two year institutions was able to predict the first-year retention rates.

Research Question 6

Between 1994-1995 and 2003-2004, were the dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions able to predict the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses?

In all cases, there were positive relationships found between the revenue patterns (dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue) and the expenditure patterns (the dollar amounts spent for instruction expenditures, academic support, student services, institutional support, and all other expenses) at public 2-year institutions and the Table 68 shows the effects:

Table 68. Results from Analysis of Question 6

	Effect From								
	Tuition & Fees per FTE			Non-Federal Approp. per FTE			All Other Revenues per FTE		
	Overall	A & S	Applied	Overall	A & S	Applied	Overall	A & S	Applied
Amount per FTE on:									
Instruction	0.503	0.697	0.468	0.548	0.260	0.574	0.201	0.274	0.136
Academic Support	0.136	0.170	0.131	0.040	0.142	0.030	0.027	0.034	0.029
Student Services	0.089	0.122	0.080	0.109	0.147	0.105	0.035	0.032	0.040
Institutional Support	---	---	---	0.090	0.173	0.081	0.102	0.107	0.104
Other Expenses	0.211	---	0.228	0.142	0.211	0.134	0.246	0.276	0.296

When institutions were tested by educational orientation, it was found that the revenue from tuition and fees per student had a stronger effect on amounts spent per student on instruction, academic support, and student services for Arts and Sciences-oriented institutions than for Applied Sciences-oriented institutions. Although, for Applied Sciences-oriented institutions, there were stronger effects from tuition and fees per student on the amounts spent per student on other expenses (there was no effect from the amount received from tuition and fees per student on the amount spent on other expenses per student for Arts and Sciences-oriented institutions). No relationship was between the amounts received from tuition and fees per student and the amounts spent on institutional support per student. To summarize, when all institutions were tested together:

- *as the amount received per student for tuition and fees increased, there were increases in the amounts spent per student on instruction, academic support, student services, and other expenses,*
- *as the amount received per student for non-federal government appropriations increased, there were increases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses, and*

- *as the amount received per student for other revenues increased, there were increases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses.*

Also, when institutions were tested by educational orientation, it was found that the revenue from non-federal government appropriations per student had stronger effects on amounts spent per student on academic support, student services, instructional support, and other expenses for Arts and Sciences-oriented institutions than for Applied Sciences-oriented institutions. For Applied Sciences-oriented institutions, there was a stronger effect from non-federal government appropriations per student on the amounts spent per student on instruction.

Finally, there were stronger relationships found between the revenue received from other sources on the expenditure patterns for Arts and Sciences-oriented institutions for the amounts spent per student on instruction, academic support, and institutional support than for Applied Sciences-oriented institutions. Applied Sciences-oriented institutions had stronger relationships between the revenue received from other sources on the amounts spent per student on student services and other expenses.

To summarize, when Arts and Sciences-oriented institutions were tested:

- *as the amount received per student for tuition and fees increased, there were increases in the amounts spent per student on instruction, academic support, and student services,*
- *as the amount received per student for non-federal government appropriations increased, there were increases in the amounts spent per*

student on instruction, academic support, student services, institutional support, and other expenses, and

- *as the amount received per student for other revenues increased, there were increases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses.*

When Applied Sciences-oriented institutions were tested:

- *as the amount received per student for tuition and fees increased, there were increases in the amounts spent per student on instruction, academic support, student services, and other expenses,*
- *as the amount received per student for non-federal government appropriations increased, there were increases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses, and*
- *as the amount received per student for other revenues increased, there were increases in the amounts spent per student on instruction, academic support, student services, institutional support, and other expenses.*

Overall, the revenue patterns of public 2-year institutions were found to have an effect on all aspects of the spending patterns of these institutions although the effects were different for institutions based upon their educational orientation.

Research Question 7

In the 2003-2004 fiscal year, were the dollar amounts received per student for tuition and fees, non-federal government appropriations, and all other sources of revenue at public 2-year institutions alone able to predict first-year retention rates?

There were slight relationships found between the revenue patterns and retention rates of public 2-year institutions and the Table 69 shows the effects:

Table 69. Results from Analysis of Question 7

	Effect From								
	Tuition and Fees per FTE			Non-Fed. Approp. per FTE			All Other Revenue per FTE		
	Overall	A & S	Applied	Overall	A & S	Applied	Overall	A & S	Applied
Retention Rates	---	---	---	0.001	0.001	---	---	---	-0.001

The dollar amount received per student for non-federal government appropriations was found to have a slight effect on the first-year retention rates for public 2-year institutions overall, indicating that a $1,000 increase in non-federal appropriations per FTE would increase retention rates by 1%. When colleges were tested individually by educational orientation, this same effect was found for Arts and Sciences-oriented institutions and that it could explain over 10% of the variability in retention rates for those types of institutions. For Applied Sciences-oriented institutions, the effect from non-federal government appropriations on first-year retention rates could not be determined to exist although 3.0% of the variability in their first-year retention rate was found to be explained by the revenue received per student from other sources.

Research Question 8

In the 2003-2004 fiscal year, were the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student services, institutional support, and all other expenses at public 2-year institutions alone able to predict first-year retention rates?

It could not be determined that the expenditure structure (the dollar amounts spent as a percentage of total spending for instruction expenditures, academic support, student

services, institutional support, and all other expenses) at public-two year institutions was able to predict the first-year retention rates.

Research Question 9

In the 2003-2004 fiscal year, were the dollar amounts spent per student for instruction expenditures, academic support, student services, institutional support, and all other expenses at public 2-year institutions alone able to predict first-year retention rates?

There were no relationships found between the expenditures patterns for the amount spent per FTE on academic support, student services, institutions support, and other expenses on retention rates but there was a relationship found between the amount spent on instruction per FTE and retention rates of public 2-year institutions and the Table 70 shows the effects:

Table 70. Results from Analysis of Question 9

	Effect From		
	Instruction per FTE		
	Overall	A & S	Applied
Retention Rates	0.001	---	0.002

The dollar amount spent per student for instruction was found to have a slight effect on the first-year retention rates for public 2-year institutions overall, indicating that a $1,000 increase in the dollar amount spent on instruction per FTE would increase retention rates by 1%. When colleges were tested individually by educational orientation, this effect was also found to exist for Applied Sciences-oriented institutions and that it could explain just over 10% of the variability in retention rates for those types of institutions, indicating that a $1,000 increase in the dollar amount spent on instruction per FTE would increase retention rates by 2%. For Arts and Sciences-oriented institutions, the effect from spending on instruction per student on retention rates could not be determined to exist.

Relationships Between Findings

For all institutions, it was found that both the dollar amount received for non-federal government appropriations per student and the dollar amount spent for instruction per student had an effect on first-year retention rates and that a total of 12.8% of the variability in retention rates could be explained by these variables (3.6% from non-federal government appropriations per student and 9.2% from spending on instruction per student). Yet, since the dollar amount spent on instruction per student has been found to be affected by other variables, those variables could be said to also have an indirect effect on first-year retention rates. The majority of the variability (56.8%) in the dollar amount spent on instruction per student is influenced by the dollar amounts received per student for tuition and fees (effect of .697), non-federal government appropriations (effect of .260), and other sources of revenue (effect of .274). There are also effects from the general institutional characteristics of the ratio of FTE students to full-time faculty (effect of -93.954) and institutional grant aid as a percentage of tuition and fee income (effect of -472.496) on the dollar amount spent on instruction per student.

For Arts and Sciences-oriented institutions, the only effect on first-year retention rates was found to exist due to the dollar amounts received from non-federal government appropriations (explaining 11.2% of the variability of these rates). No other variables were found to have a direct or indirect effect on first-year retention rates.

For Applied Sciences-oriented institutions, a direct negative effect on first-year retention rates was found to exist from the dollar amount received for other sources of revenue per student and a direct positive effect from the dollar amount spent for instruction per student explaining a total of 13.3% of the variability in retention rates (3.0% from other

sources of revenue per student and 10.3% from spending on instruction per student). Yet, since the dollar amount spent on instruction per student has been found to be affected by other variables, those variables could be said to also have an indirect effect on first-year retention rates. The majority of the variability (62.5%) in the dollar amount spent on instruction per student is influenced by the dollar amounts received per student for tuition and fees (effect of .468), non-federal government appropriations (effect of .574), and other sources of revenue (effect of .136). There are also effects from the general institutional characteristics of the ratio of FTE students to full-time faculty (effect of -100.891) and the percentage of total full-time employees as faculty (effect of -385.089).

Other Related Findings

Through the trend analysis of the variables, there were findings in both the changes within the variables over time as well as the differences between Arts and Sciences-oriented institutions and Applied Sciences-oriented institutions.

Findings Regarding Variables

Both of the general institutional characteristics within this study experienced large changes over the ten year period. The ratio of FTE students to full-time faculty increased by 17.1% and the percentage of full-time employees as faculty decreased by 12.3% from 1994-1995 to 2003-2004. In both types of institutional orientations, the number of full-time faculty employees decreased when compared to the number of students and the number of employees overall partially indicating a stronger reliance on adjunct faculty.

Revenues received from most sources remained fairly stable over the ten year period although a decrease of 11.2% was experienced in the percentage of total revenue received from tuition and fees (the *dollar amounts* received for tuition and fees per FTE was almost

constant with an increase of .4% over the same period). This decrease in revenue was offset by an increase of 11.9% in the percentage of total revenue received other sources. When looked at on a per FTE student basis, the revenue received from other sources increased even more (32.0%) over the ten year period indicating the reliance that public 2-year institutions have come to have on other sources of revenue.

There were large increases (in constant dollars) in all categories of expenditures per FTE student except in the category of amount spent on instruction which only increased 3.1% over the ten year period. The rest of the amounts spent per FTE student experienced larger increases:

- for academic support, 15.4%,
- for student services, 18.7%,
- for institutional support, 11.5%, and
- for other expenses, 21.7%.

Over the same period of time, expenditures remained almost constant when expressed as a percentage of total expenditures.

Findings Regarding Educational Orientation

There were differences found between the Arts and Sciences-oriented institutions and the Applied Sciences-oriented institutions in the categories of general institutional characteristics, revenue structure/patterns, and expenditure structure/patterns. When the general institutional characteristics were examined by educational orientation, Arts and Sciences-oriented institutions had almost five more FTE students to full-time faculty with a 34.24 student-to-faculty ratio as opposed to the Applied Sciences-oriented institutions having only a 29.91 student-to-faculty ratio.

Although most of the sources of revenue were the same between the two types of institutions, there were two categories of sources of revenue that had large differences. The Applied Sciences-oriented institutions received approximately $246 more per student for tuition and fees and approximately $810 more per student for non-federal government appropriations than did the Arts and Sciences-oriented institutions. Yet, when expenditures were examined, most expenditure categories were very similar between the types of institutions except for the dollar amount spent per student on instruction which was approximately $721 higher for Applied Sciences-oriented institutions.

Recommendations for Further Study

There are several different areas that could be studied further to continue to understand the relationships between institutional characteristics and student outcomes. Since public 2-year institutions were the only institutions studied, other types of institutions (including public 4-year and private institutions) could also be studied in a similar manner and outcomes could be compared to the findings from this study. Also, since only three different general institutional characteristics were examined in this study, additional characteristics could be examined for their relationships to revenue and expenditure patterns/structure and/or retention rates.

With the changes to the new Government Accounting Standards Board (GASB) requirements taking place within the timeframe of this study, this study could be replicated at a later date to determine whether or not these findings were affected by the change in reporting format. Since retention rates were only available for the 2003-2004 fiscal year, the timeframe of this study could be extended to include future years' retention rates to determine if the relationship was consistent over a longer period of time. Finally, since the

amount spent on instruction per student was found to have an effect on the first-year retention rates of public 2-year institutions, the use of adjunct faculty within these institutions should be further studied to ascertain their effect on retention rates.

Implications for Practice

Since there has been significantly more research that addresses how student characteristics impact retention rates than how institutional characteristics impact these rates (Berger, 2001-2002), this study of the relationship between institutional characteristics and retention rates of public 2-year educational institutions has important implications for practice.

First, understanding these relationships can help institutions evaluate their financial strategies to improve student outcomes. This study found that first-year retention rates were directly positively affected by the dollar amounts spent on instruction per student for Applied Sciences-oriented institutions yet these same institutions experienced a negative effect from the dollar amounts received from other sources of revenue per student.

Second, the results of this study may serve as evidence to support institutional efforts in obtaining certain forms of revenue that could potentially benefit student performance. As this study found, Arts and Sciences-oriented institutions who received higher dollar amounts per student for non-federal government appropriations were able to achieve higher retention rates. Also, Applied Sciences-oriented institutions spent more per student on instruction (which was found to further impact retention rates) when they received higher dollar amounts per student from any of the following sources: tuition and fees, non-federal government appropriation, and other sources of revenue – although the spending on instruction per

student was impacted the most by the amount received for non-federal government appropriations.

The further importance of this study would be the positive impacts to the students and the community as a result of students achieving greater educational attainment. Finally, this study should contribute to the general knowledge and research in higher education regarding the relationship between the public 2-year educational institutions' institutional characteristics and student outcomes.

Summary

The purpose of this study was to understand the relationship between the public 2-year educational institutions' institutional characteristics and first-year retention rates within the framework of the resource dependence theory and the conceptual framework of the organizational nature of student persistence. This study has provided an understanding of how an institution's characteristics and revenue and expenditure structures/patterns impact student retention rates in an effort to assist organizations in their configuration of resources to improve these rates.

APPENDIX A:

DEFINITIONS OF VARIABLES, CALCULATION PROCEDURES, DESCRIPTIONS OF THE DATABASE AND CATEGORIES

Table 1. Definition, Calculation Procedures, and Description of the Database and Categories Used to Locate the Variables for Research Questions 1, 2, & 3

Variable	Definition	Calculated	Database and Categories
FTE	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students	IPEDS; Enrollment; 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Race/ethnicity gender, attendance status, and level of student, Fall 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Total part-time undergraduates; Grand total men; grand total women, (NCES, 2004; NCES, 2003; NCES, 2002; NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997; NCES, 1996; NCES, 1995). IPEDS; Enrollment; 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Race/ethnicity gender, attendance status, and level of student, Fall 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Total full-time undergraduates; Grand total men; grand total women (NCES, 2004; NCES, 2003; NCES, 2002; NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997; NCES, 1996; NCES, 1995).
FTF	Full-Time Faculty	Total full-time faculty	IPEDS; Fall Staff; 2004, 2003, 2002, 2001, 1999, 1997, 1995; Employees by primary occupation, race/ethnicity, and gender (Degree-granting institutions); Fall 2004, 2003, 2002, 2001, 1999, 1997, 1995; Full time faculty total; Grand total men; grand total women (NCES, 2004; NCES, 2003; NCES, 2002; NCES, 2001; NCES, 1999; NCES, 1997; NCES, 1995).
FTTE	Full-Time Total Employees	Total full-time employees	IPEDS; Fall Staff; 2004, 2003, 2002, 2001, 1999, 1997, 1995; Employees by primary occupation, race/ethnicity, and gender (Degree-granting institutions); Fall 2004, 2003, 2002, 2001, 1999, 1997, 1995; Full time total; Grand total men; grand total women (NCES, 2004; NCES, 2003; NCES, 2002; NCES, 2001; NCES, 1999; NCES, 1997; NCES, 1995).
CRSF	Ratio of Full-Time Equivalent Students to Full-Time Faculty	FTE divided by FTF	(Variables identified above.)
CTEF	Percentage of Total Full-Time Employees who are Faculty	FTF divided by FTTE	(Variables identified above.)

Table 1. (continued)

Variable	Definition	Calculated	Database and Categories
SCHO	Scholarships and Fellowships	Total scholarships and fellowships (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Expenses and other deductions; Scholarships and fellowships expenses - current year total (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund expenditures by function; Scholarships and fellowships (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds expenditures by function; Fiscal Year 1996, 1995; Scholarships fellowships (NCES, 1996; NCES, 1995).
RTF	Tuition and Fees	Total tuition and fees (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Revenues and other additions; Tuition and fees, after deducting discounts and allowances (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund revenues by source; Tuition and fees (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds revenues by source; Fiscal Year 1996, 1995; Tuition and fees (NCES, 1996; NCES, 1995).
CGTF	Institutional Grant Aid as a Percent of Tuition & Fee Income	SCHO divided by RTF (adjusted by CPI, as needed)	(Variables identified above.)
RETR	Retention Rate	Full-time retention rate	IPEDS: Enrollments: Retention rates for the 2003 cohort, by attendance status: Fall 2004; Percent of first-time full-time degree/certificate-seeking undergraduate students in fall 2003 returning in fall 2004 (NCES, 2004).

Table 2. Definition, Calculation Procedures, and Description of the Database and Categories Used to Locate the Variables for Research Questions 4, 5, 6, & 7

Variable	Definition	Calculated	Database and Categories
RTF	Tuition and Fees	Total tuition and fees (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Revenues and other additions; Tuition and fees, after deducting discounts and allowances (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund revenues by source; Tuition and fees (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds revenues by source; Fiscal Year 1996, 1995; Tuition and fees (NCES, 1996; NCES, 1995).
RS	State Appropriations	Total state appropriations (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Revenues and other additions, State appropriations (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Revenues and other additions, State appropriations (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds revenues by source; Fiscal Year 1996, 1995; State appropriations (NCES, 1996; NCES, 1995).
RL	Local Appropriations	Total local appropriations (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Revenues and other additions, Local appropriations, education district taxes, and similar support (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund revenues by source, Local appropriations (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds revenues by source; Fiscal Year 1996, 1995; Local appropriations (NCES, 1996; NCES, 1995).
RSL	Total of Non-Federal Appropriations	RS plus RL (adjusted by CPI, as needed)	(Variables identified above.)

Table 2. (continued)

Varaible	Definition	Calculated	Database and Categories
TREV	Total Revenue	Total of all revenues (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Revenues and other additions; Total all revenues and other additions (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund revenues by source; Total current fund revenues (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds revenues by source; Fiscal Year 1996, 1995; Total current fund revenues (NCES, 1996; NCES, 1995).
ROS	Other Sources of Revenue	TREV minus RTF, RS, and RL (adjusted by CPI, as needed)	(Variables identified above.)
RTF%	% from Tuition and Fees	RTF divided by TREV (adjusted by CPI, as needed)	(Variables identified above.)
RSL%	% from Non-Federal Appropriations	RSL divided by TREV (adjusted by CPI, as needed)	(Variables identified above.)
ROS%	% from Other Sources of Revenue	ROS divided by TREV (adjusted by CPI, as needed)	(Variables identified above.)
FTE	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students	IPEDS; Enrollment; 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Race/ethnicity gender, attendance status, and level of student, Fall 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Total part-time undergraduates; Grand total men; grand total women, (NCES, 2004; NCES, 2003; NCES, 2002; NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997; NCES, 1996; NCES, 1995).

Table 2. (continued)

Variable	Definition	Calculated	Database and Categories
FTE (continued)	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students	IPEDS; Enrollment; 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Race/ethnicity gender, attendance status, and level of student, Fall 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Total full-time undergraduates; Grand total men; grand total women (NCES, 2004; NCES, 2003; NCES, 2002; NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997; NCES, 1996; NCES, 1995).
RTFS	Tuition and Fees per Student	RTF divided by FTE (adjusted by CPI, as needed)	(Variables identified above.)
RSLS	Non-Federal Appropriations per Student	RSL divided by FTE (adjusted by CPI, as needed)	(Variables identified above.)
ROSS	Other Sources of Revenue per Student	ROS divided by FTE (adjusted by CPI, as needed)	(Variables identified above.)
RETR	Retention Rate	Full-time retention rate	IPEDS: Enrollments: Retention rates for the 2003 cohort, by attendance status: Fall 2004; Percent of first-time full-time degree/certificate-seeking undergraduate students in fall 2003 returning in fall 2004 (NCES, 2004).
CPI	Consumer Price Index	Average of Monthly Consumer Price Indices for Fiscal Year	US Department of Labor, Bureau of Labor Statistics (2006).

Table 3. Definition, Calculation Procedures, and Description of the Database and Categories Used to Locate the Variables for Research Questions 8 & 9

Variable	Definition	Calculated	Database and Categories
EIN	Expenditures for Instruction	Total instruction expenditures (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Expenses and other deductions; Instruction - current year total (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund expenditures by function; Instruction (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds expenditures by function; Fiscal Year 1996, 1995; Instruction (NCES, 1996; NCES, 1995).
EAS	Expenditures for Academic Support	Total academic support expenditures (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Expenses and other deductions; Academic support - current year total (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund expenditures by function; Academic support (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds expenditures by function; Fiscal Year 1996, 1995; Academic support (NCES, 1996; NCES, 1995).
ESS	Expenditures for Student Services	Total student services expenditures (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Expenses and other deductions; Student services - current year total (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund expenditures by function; Student services (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds expenditures by function; Fiscal Year 1996, 1995; Student services (NCES, 1996; NCES, 1995).

Table 3. (continued)

Variable	Definition	Calculated	Database and Categories
EIS	Expenditures for Institutional Support	Total institutional support expenditures (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Expenses and other deductions; Institutional support - current year total (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund expenditures by function; Institutional support (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds expenditures by function; Fiscal Year 1996, 1995; Institutional support (NCES, 1996; NCES, 1995).
TEXP	Total Expenditures	Total current year expenditures (adjusted by CPI, as needed)	IPEDS; Finance; 2004, 2003, 2002; Public institutions - GASB 34/35; Fiscal Year 2004, 2003, 2002; Expenses and other deductions; Total expenses deductions - current year total (NCES, 2004; NCES, 2003; NCES, 2002). IPEDS; Finance; 2001, 2000, 1999, 1998, 1997; Public institutions (GASB); Fiscal Year 2001, 2000, 1999, 1998, 1997; Current fund expenditures by function; Total current fund expenditures and transfers (NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997). IPEDS; Finance; 1996, 1995; Current funds expenditures by function; Fiscal Year 1996, 1995; Total current fund expenditures and transfers (NCES, 1996; NCES, 1995).
EOE	Other Expenditures	TEXP minus EIN, EAS, ESS, and EIS (adjusted by CPI, as needed)	(Variables identified above.)
EIN%	% on Instruction	EIN divided by TEXP (adjusted by CPI, as needed)	(Variables identified above.)
EAS%	% on Academic Support	EAS divided by TEXP (adjusted by CPI, as needed)	(Variables identified above.)
ESS%	% on Student Services	ESS divided by TEXP (adjusted by CPI, as needed)	(Variables identified above.)

Table 3. (continued)

Variable	Definition	Calculated	Database and Categories
EIS%	% on Instructional Support	EIS divided by TEXP (adjusted by CPI, as needed)	(Variables identified above.)
EOE%	% on Other Expense	EOE divided by TEXP (adjusted by CPI, as needed)	(Variables identified above.)
FTE	Full-Time Equivalent Enrollment	Part-time undergraduate students multiplied by .33 plus full-time undergraduate students	IPEDS; Enrollment; 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Race/ethnicity gender, attendance status, and level of student, Fall 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Total part-time undergraduates; Grand total men; grand total women, (NCES, 2004; NCES, 2003; NCES, 2002; NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997; NCES, 1996; NCES, 1995). IPEDS; Enrollment; 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Race/ethnicity gender, attendance status, and level of student, Fall 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995; Total full-time undergraduates; Grand total men; grand total women (NCES, 2004; NCES, 2003; NCES, 2002; NCES, 2001; NCES, 2000; NCES, 1999; NCES, 1998; NCES, 1997; NCES, 1996; NCES, 1995).
EINS	Instruction Expenditures per Student	EIN divided by FTE (adjusted by CPI, as needed)	(Variables identified above.)
EASS	Academic Support Expenditures per Student	EAS divided by FTE (adjusted by CPI, as needed)	(Variables identified above.)
ESSS	Student Support Expenditures per Student	ESS divided by FTE (adjusted by CPI, as needed)	(Variables identified above.)
EISS	Institutional Support Expenditures per Student	EIS divided by FTE (adjusted by CPI, as needed)	(Variables identified above.)

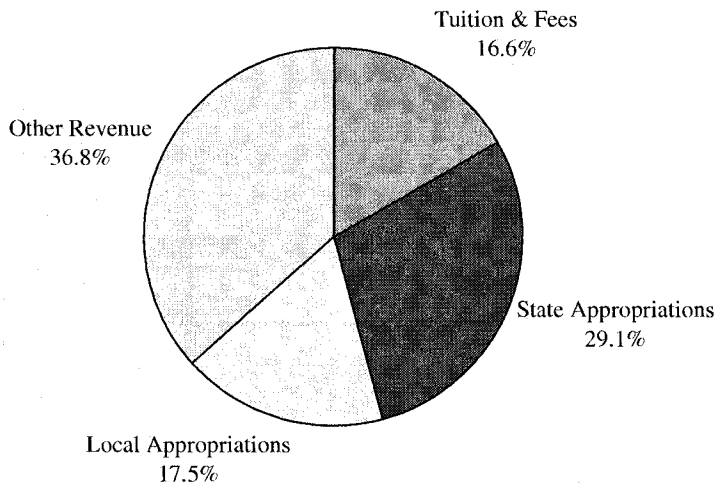
Table 3. (continued)

Variable	Definition	Calculated	Database and Categories
EOES	Other Expenditures per Student	EOE divided by FTE (adjusted by CPI, as needed)	(Variables identified above.)
RETR	Retention Rate	Full-time retention rate	IPEDS: Enrollments: Retention rates for the 2003 cohort, by attendance status: Fall 2004; Percent of first-time full-time degree/certificate-seeking undergraduate students in fall 2003 returning in fall 2004 (NCES, 2004).
CPI	Consumer Price Index	Average of Monthly Consumer Price Indices for Fiscal Year	US Department of Labor, Bureau of Labor Statistics (2006).

APPENDIX B:

PERCENTAGE TOTAL REVENUES AND EXPENDITURES AT PUBLIC 2-YEAR INSTITUTIONS

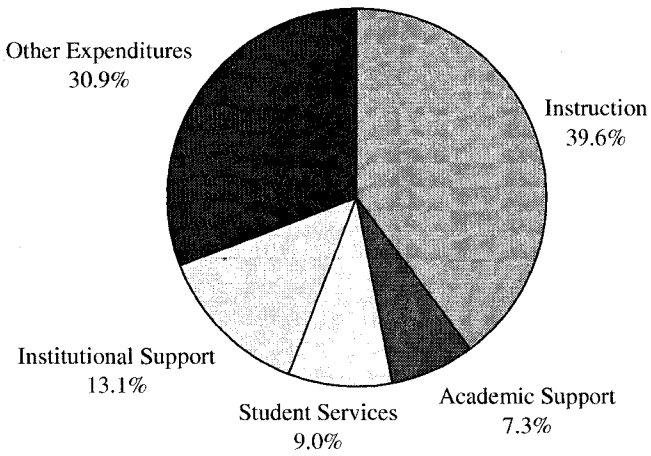
Percentage Total Revenues for Public Two-Year Institutions
2003-2004



Dollar Amounts Received in Public 2-year Institutions
2003-2004

Tuition & Fees	**State Appropriations**	**Local Appropriations**	**Other Revenue**
6,166,880,261	10,791,291,997	6,491,258,627	13,641,033,184

Percentage Total Expenditures for Public Two-Year Institutions
2003-2004



Dollar Amounts Paid in Public 2-year Institutions
2003-2004

Instruction	**Academic Support**	**Student Services**	**Institutional Support**	**Other Expenditures**
13,782,144,866	2,527,654,410	3,144,578,022	4,565,272,479	10,749,496,979

APPENDIX C:

CORRELATIONS MATRICES FOR RESEARCH QUESTIONS 1 – 9

Question 1 Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.201(a)	.041	.018	8.013

a Predictors: (Constant), CGTF, CTEF, CRSF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	350.234	3	116.745	1.818	.147(a)
	Residual	8283.074	129	64.210		
	Total	8633.308	132			

a Predictors: (Constant), CGTF, CTEF, CRSF
b Dependent Variable: RETR

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	52.166	4.644		11.234	.000		
	CRSF	.030	.053	.053	.554	.580	.825	1.212
	CTEF	16.945	9.818	.160	1.726	.087	.860	1.163
	CGTF	-2.677	1.607	-.147	-1.665	.098	.951	1.051

a Dependent Variable: RETR

Question 2 Regression – % Expenditures on Instruction

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.464(a)	.216	.214	.079214959559839

a Predictors: (Constant), CGTF, CRSF, CTEF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.140	3	.713	113.667	.000(a)
	Residual	7.781	1240	.006		
	Total	9.921	1243			

a Predictors: (Constant), CGTF, CRSF, CTEF
b Dependent Variable: EIN%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.324	.017		18.870	.000		
	CRSF	-.001	.000	-.189	-6.557	.000	.760	1.316
	CTEF	.321	.031	.302	10.436	.000	.757	1.320
	CGTF	-.033	.005	-.164	-6.493	.000	.996	1.004

a Dependent Variable: EIN%

Question 2 Regression – % Expenditures on Instruction – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.366(a)	.134	.129	.067259853698273

a Predictors: (Constant), CGTF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.217	2	.108	23.935	.000(a)
	Residual	1.398	309	.005		
	Total	1.614	311			

a Predictors: (Constant), CGTF, CRSF
b Dependent Variable: EIN%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.456	.016		28.796	.000		
	CRSF	-.001	.000	-.201	-3.593	.000	.895	1.118
	CGTF	-.069	.010	-.378	-6.759	.000	.895	1.118

a Dependent Variable: EIN%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 2 Regression – % Expenditures on Instruction – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.500(a)	.250	.248	.081324518668126

a Predictors: (Constant), CGTF, CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.051	3	.684	103.382	.000(a)
	Residual	6.137	928	.007		
	Total	8.189	931			

a Predictors: (Constant), CGTF, CTEF, CRSF
b Dependent Variable: EIN%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.300	.020		14.942	.000		
	CRSF	-.002	.000	-.203	-6.175	.000	.749	1.335
	CTEF	.383	.037	.343	10.472	.000	.753	1.327
	CGTF	-.024	.006	-.117	-4.099	.000	.991	1.009

a Dependent Variable: EIN%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 2 Regression – % Expenditures on Academic Support

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.095(a)	.009	.007	.040410959896243

a Predictors: (Constant), CGTF, CRSF, CTEF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.018	3	.006	3.729	.011(a)
	Residual	2.025	1240	.002		
	Total	2.043	1243			

a Predictors: (Constant), CGTF, CRSF, CTEF
b Dependent Variable: EAS%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.055	.009		6.310	.000		
	CRSF	.000	.000	.094	2.910	.004	.760	1.316
	CTEF	.020	.016	.041	1.277	.202	.757	1.320
	CGTF	-.004	.003	-.045	-1.583	.114	.996	1.004

a Dependent Variable: EAS%

Question 2 Regression – % Expenditures on Academic Support – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.211(a)	.045	.038	.040910436000209

a Predictors: (Constant), CGTF, CTEF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.024	2	.012	7.198	.001(a)
	Residual	.517	309	.002		
	Total	.541	311			

a Predictors: (Constant), CGTF, CTEF
b Dependent Variable: EAS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.050	.012		4.254	.000		
	CTEF	.082	.028	.160	2.871	.004	.996	1.004
	CGTF	-.014	.006	-.128	-2.298	.022	.996	1.004

a Dependent Variable: EAS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 2 Regression – % Expenditures on Student Services

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.060(a)	.004	.001	.036538649572931

a Predictors: (Constant), CGTF, CRSF, CTEF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.006	3	.002	1.513	.210(a)
	Residual	1.655	1240	.001		
	Total	1.662	1243			

a Predictors: (Constant), CGTF, CRSF, CTEF
b Dependent Variable: ESS%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.088	.008		11.172	.000		
	CRSF	.000	.000	.031	.950	.342	.760	1.316
	CTEF	-.005	.014	-.011	-.348	.728	.757	1.320
	CGTF	-.004	.002	-.048	-1.693	.091	.996	1.004

a Dependent Variable: ESS%

Question 2 Regression – % Expenditures on Student Services – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.177(a)	.031	.028	.035474446894521

a Predictors: (Constant), CTEF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.013	1	.013	9.978	.002(a)
	Residual	.390	310	.001		
	Total	.403	311			

a Predictors: (Constant), CTEF
b Dependent Variable: ESS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.058	.010		6.020	.000		
	CTEF	.078	.025	.177	3.159	.002	1.000	1.000

a Dependent Variable: ESS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 2 Regression – % Expenditures on Institutional Support

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.317(a)	.100	.099	.049202317191849

a Predictors: (Constant), CTEF, CRSF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.335	2	.167	69.091	.000(a)
	Residual	3.004	1241	.002		
	Total	3.339	1243			

a Predictors: (Constant), CTEF, CRSF
b Dependent Variable: EIS%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.146	.010		13.969	.000		
	CRSF	.001	.000	.207	6.713	.000	.760	1.315
	CTEF	-.098	.019	-.158	-5.128	.000	.760	1.315

a Dependent Variable: EIS%

Question 2 Regression – % Expenditures on Institutional Support – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.273(a)	.074	.068	.050159188836238

a Predictors: (Constant), CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.062	2	.031	12.413	.000(a)
	Residual	.777	309	.003		
	Total	.840	311			

a Predictors: (Constant), CTEF, CRSF
b Dependent Variable: EIS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.145	.021		6.771	.000		
	CRSF	.001	.000	.175	2.889	.004	.819	1.221
	CTEF	-.094	.039	-.148	-2.446	.015	.819	1.221

a Dependent Variable: EIS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 2 Regression – % Expenditures on Institutional Support – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.328(a)	.108	.106	.048948548865322

a Predictors: (Constant), CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.269	2	.135	56.157	.000(a)
	Residual	2.226	929	.002		
	Total	2.495	931			

a Predictors: (Constant), CTEF, CRSF
b Dependent Variable: EIS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.146	.012		12.202	.000		
	CRSF	.001	.000	.217	6.066	.000	.754	1.327
	CTEF	-.100	.022	-.162	-4.532	.000	.754	1.327

a Dependent Variable: EIS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 2 Regression – % Expenditures on Other Expenses

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.347(a)	.120	.119	.075516060325118

a Predictors: (Constant), CGTF, CTEF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.967	2	.483	84.773	.000(a)
	Residual	7.077	1241	.006		
	Total	8.044	1243			

a Predictors: (Constant), CGTF, CTEF
b Dependent Variable: EOE%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.394	.011		36.228	.000		
	CTEF	-.245	.026	-.256	-9.612	.000	.997	1.003
	CGTF	.040	.005	.219	8.210	.000	.997	1.003

a Dependent Variable: EOE%

Question 2 Regression – % Expenditures on Other Expenses – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.424(a)	.180	.174	.065002035635006

a Predictors: (Constant), CGTF, CTEF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.286	2	.143	33.802	.000(a)
	Residual	1.306	309	.004		
	Total	1.591	311			

a Predictors: (Constant), CGTF, CTEF
b Dependent Variable: EOE%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.355	.019		19.093	.000		
	CTEF	-.165	.045	-.188	-3.650	.000	.996	1.004
	CGTF	.067	.009	.368	7.128	.000	.996	1.004

a Dependent Variable: EOE%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 2 Regression – % Expenditures on Other Expenses – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.333(a)	.111	.109	.078359498763392

a Predictors: (Constant), CGTF, CTEF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.710	2	.355	57.835	.000(a)
	Residual	5.704	929	.006		
	Total	6.414	931			

a Predictors: (Constant), CGTF, CTEF
b Dependent Variable: EOE%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.403	.013		30.567	.000		
	CTEF	-.264	.031	-.268	-8.633	.000	.997	1.003
	CGTF	.033	.006	.183	5.903	.000	.997	1.003

a Dependent Variable: EOE%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 3 Regression – Instruction per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.614(a)	.377	.376	1443.96246104541400

a Predictors: (Constant), CGTF, CRSF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1548954610.610	2	774477305.305	371.447	.000(a)
	Residual	2564583934.357	1230	2085027.589		
	Total	4113538544.967	1232			

a Predictors: (Constant), CGTF, CRSF
b Dependent Variable: EINS

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7459.573	123.614		60.346	.000		
	CRSF	-93.954	3.516	-.602	-26.723	.000	1.000	1.000
	CGTF	-472.496	94.303	-.113	-5.010	.000	1.000	1.000

a Dependent Variable: EINS

Question 3 Regression – Instruction per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.534(a)	.286	.279	889.16385232855800

a Predictors: (Constant), CGTF, CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	97622484.741	3	32540828.247	41.159	.000(a)
	Residual	244299218.093	309	790612.356		
	Total	341921702.834	312			

a Predictors: (Constant), CGTF, CTEF, CRSF
b Dependent Variable: EINS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7119.758	445.313		15.988	.000		
	CRSF	-64.062	5.897	-.630	-10.864	.000	.688	1.453
	CTEF	-2517.476	734.726	-.190	-3.426	.001	.751	1.332
	CGTF	-542.357	138.470	-.199	-3.917	.000	.893	1.119

a Dependent Variable: EINS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 3 Regression – Instruction per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.623(a)	.388	.387	1550.51170719583600

a Predictors: (Constant), CGTF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1399982502.391	2	699991251.195	291.167	.000(a)
	Residual	2204547370.157	917	2404086.554		
	Total	3604529872.548	919			

a Predictors: (Constant), CGTF, CRSF
b Dependent Variable: EINS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7735.169	143.322		53.970	.000		
	CRSF	-100.891	4.295	-.609	-23.492	.000	.992	1.008
	CGTF	-385.089	113.439	-.088	-3.395	.001	.992	1.008

a Dependent Variable: EINS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 3 Regression – Academic Support per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.150(a)	.023	.021	500.391925865049000

a Predictors: (Constant), CTEF, CRSF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7091122.314	2	3545561.157	14.160	.000(a)
	Residual	307982257.749	1230	250392.079		
	Total	315073380.064	1232			

a Predictors: (Constant), CTEF, CRSF
b Dependent Variable: EASS

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1210.603	109.844		11.021	.000		
	CRSF	-7.531	1.416	-.174	-5.319	.000	.740	1.351
	CTEF	-508.817	199.100	-.084	-2.556	.011	.740	1.351

a Dependent Variable: EASS

Question 3 Regression – Academic Support per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.163(a)	.026	.023	500.791259082903000

a Predictors: (Constant), CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2118367.223	1	2118367.223	8.447	.004(a)
	Residual	77996276.289	311	250791.885		
	Total	80114643.512	312			

a Predictors: (Constant), CRSF
b Dependent Variable: EASS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1030.947	97.407		10.584	.000		
	CRSF	-8.007	2.755	-.163	-2.906	.004	1.000	1.000

a Dependent Variable: EASS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 3 Regression – Academic Support per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.164(a)	.027	.025	499.210863392817000

a Predictors: (Constant), CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6339653.590	2	3169826.795	12.719	.000(a)
	Residual	228526932.781	917	249211.486		
	Total	234866586.371	919			

a Predictors: (Constant), CTEF, CRSF
b Dependent Variable: EASS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1329.120	125.015		10.632	.000		
	CRSF	-7.886	1.598	-.187	-4.936	.000	.743	1.346
	CTEF	-773.556	227.863	-.128	-3.395	.001	.743	1.346

a Dependent Variable: EASS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 3 Regression – Student Services per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.275(a)	.075	.074	488.589690053339000

a Predictors: (Constant), CTEF, CRSF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23946691.650	2	11973345.825	50.156	.000(a)
	Residual	293625458.828	1230	238719.885		
	Total	317572150.478	1232			

a Predictors: (Constant), CTEF, CRSF
b Dependent Variable: ESSS

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1722.993	107.253		16.065	.000		
	CRSF	-13.797	1.383	-.318	-9.979	.000	.740	1.351
	CTEF	-845.689	194.404	-.139	-4.350	.000	.740	1.351

a Dependent Variable: ESSS

Question 3 Regression – Student Services per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.306(a)	.094	.091	413.382541733266000

a Predictors: (Constant), CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5486109.202	1	5486109.202	32.104	.000(a)
	Residual	53145274.127	311	170885.126		
	Total	58631383.329	312			

a Predictors: (Constant), CRSF
b Dependent Variable: ESSS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1316.573	80.405		16.374	.000		
	CRSF	-12.885	2.274	-.306	-5.666	.000	1.000	1.000

a Dependent Variable: ESSS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 3 Regression – Student Services per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.285(a)	.081	.078	507.063229486882000

a Predictors: (Constant), CGTF, CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20810722.247	3	6936907.416	26.980	.000(a)
	Residual	235515616.727	916	257113.119		
	Total	256326338.974	919			

a Predictors: (Constant), CGTF, CTEF, CRSF
b Dependent Variable: ESSS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1919.254	127.765		15.022	.000		
	CRSF	-13.634	1.628	-.309	-8.376	.000	.739	1.354
	CTEF	-1185.883	231.448	-.188	-5.124	.000	.743	1.346
	CGTF	-92.346	37.098	-.079	-2.489	.013	.992	1.008

a Dependent Variable: ESSS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 3 Regression – Institutional Support per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.299(a)	.089	.088	630.171066132656000

a Predictors: (Constant), CTEF, CRSF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47914915.099	2	23957457.549	60.329	.000(a)
	Residual	488452154.287	1230	397115.573		
	Total	536367069.385	1232			

a Predictors: (Constant), CTEF, CRSF
b Dependent Variable: EISS

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2968.272	138.333		21.458	.000		
	CRSF	-14.591	1.783	-.259	-8.182	.000	.740	1.351
	CTEF	-2626.640	250.737	-.331	-10.476	.000	.740	1.351

a Dependent Variable: EISS

Question 3 Regression – Institutional Support per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.259(a)	.067	.061	650.729176065049000

a Predictors: (Constant), CGTF, CTEF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9417898.979	2	4708949.490	11.120	.000(a)
	Residual	131269022.781	310	423448.461		
	Total	140686921.760	312			

a Predictors: (Constant), CGTF, CTEF
b Dependent Variable: EISS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2023.734	188.951		10.710	.000		
	CTEF	-1892.530	465.896	-.223	-4.062	.000	1.000	1.000
	CGTF	231.292	95.781	.132	2.415	.016	1.000	1.000

a Dependent Variable: EISS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 3 Regression – Institutional Support per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.323(a)	.104	.102	620.638649838068000

a Predictors: (Constant), CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	41076572.934	2	20538286.467	53.320	.000(a)
	Residual	353221369.978	917	385192.334		
	Total	394297942.912	919			

a Predictors: (Constant), CTEF, CRSF
b Dependent Variable: EISS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3073.106	155.424		19.772	.000		
	CRSF	-15.966	1.986	-.291	-8.039	.000	.743	1.346
	CTEF	-2737.058	283.288	-.350	-9.662	.000	.743	1.346

a Dependent Variable: EISS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 3 Regression – Other Expenses per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.485(a)	.236	.234	1109.961074253011000

a Predictors: (Constant), CGTF, CRSF, CTEF

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	466766196.684	3	155588732.228	126.288	.000(a)
	Residual	1514144697.633	1229	1232013.586		
	Total	1980910894.317	1232			

a Predictors: (Constant), CGTF, CRSF, CTEF
b Dependent Variable: EOES

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7372.063	247.070		29.838	.000		
	CRSF	-55.535	3.141	-.513	-17.681	.000	.740	1.351
	CTEF	-6052.382	441.829	-.397	-13.698	.000	.740	1.352
	CGTF	421.005	72.521	.145	5.805	.000	.999	1.001

a Dependent Variable: EOES

Question 3 Regression – Other Expenses per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.613(a)	.376	.370	866.326484923716000

a Predictors: (Constant), CGTF, CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	139762291.186	3	46587430.395	62.073	.000(a)
	Residual	231911167.750	309	750521.578		
	Total	371673458.937	312			

a Predictors: (Constant), CGTF, CTEF, CRSF
b Dependent Variable: EOES
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5982.048	433.875		13.787	.000		
	CRSF	-43.095	5.745	-.406	-7.501	.000	.688	1.453
	CTEF	-4566.201	715.855	-.331	-6.379	.000	.751	1.332
	CGTF	1072.307	134.914	.378	7.948	.000	.893	1.119

a Dependent Variable: EOES
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 3 Regression – Other Expenses per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.463(a)	.214	.212	1171.141620531553000

a Predictors: (Constant), CGTF, CTEF, CRSF

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	342634072.528	3	114211357.509	83.270	.000(a)
	Residual	1256360588.933	916	1371572.695		
	Total	1598994661.461	919			

a Predictors: (Constant), CGTF, CTEF, CRSF
b Dependent Variable: EOES
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7599.993	295.093		25.755	.000		
	CRSF	-55.396	3.759	-.502	-14.735	.000	.739	1.354
	CTEF	-6384.637	534.565	-.406	-11.944	.000	.743	1.346
	CGTF	280.799	85.684	.096	3.277	.001	.992	1.008

a Dependent Variable: EOES
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 4 Regression – % Expenditures on Instruction

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.333(a)	.111	.110	.087900079666842

a Predictors: (Constant), ROS%

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.973	1	1.973	255.316	.000(a)
	Residual	15.816	2047	.008		
	Total	17.789	2048			

a Predictors: (Constant), ROS%
b Dependent Variable: EIN%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.471	.005		92.804	.000		
	ROS%	-.232	.015	-.333	-15.979	.000	1.000	1.000

a Dependent Variable: EIN%

Question 4 Regression – % Expenditures on Instruction – Arts & Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.363(a)	.132	.130	.065651176432324

a Predictors: (Constant), RTF%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.319	1	.319	73.902	.000(a)
	Residual	2.103	488	.004		
	Total	2.422	489			

a Predictors: (Constant), RTF%
b Dependent Variable: EIN%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.306	.009		34.569	.000		
	RTF%	.319	.037	.363	8.597	.000	1.000	1.000

a Dependent Variable: EIN%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 4 Regression – % Expenditures on Instruction – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.386(a)	.149	.148	.091015213350322

a Predictors: (Constant), ROS%, RTF%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.252	2	1.126	135.923	.000(a)
	Residual	12.890	1556	.008		
	Total	15.141	1558			

a Predictors: (Constant), ROS%, RTF%
b Dependent Variable: EIN%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.511	.009		56.715	.000		
	RTF%	-.080	.025	-.076	-3.159	.002	.951	1.052
	ROS%	-.281	.017	-.395	-16.480	.000	.951	1.052

a Dependent Variable: EIN%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 4 Regression – % Expenditures on Academic Support

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.217(a)	.047	.046	.040689041412233

a Predictors: (Constant), ROS%, RTF%

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.168	2	.084	50.736	.000(a)
	Residual	3.387	2046	.002		
	Total	3.555	2048			

a Predictors: (Constant), ROS%, RTF%
b Dependent Variable: EAS%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.059	.004		16.048	.000		
	RTF%	.087	.010	.189	8.480	.000	.935	1.069
	ROS%	-.022	.007	-.069	-3.102	.002	.935	1.069

a Dependent Variable: EAS%

Question 4 Regression – % Expenditures on Academic Support – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.293(a)	.086	.082	.042347967402370

a Predictors: (Constant), ROS%, RTF%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.082	2	.041	22.783	.000(a)
	Residual	.873	487	.002		
	Total	.955	489			

a Predictors: (Constant), ROS%, RTF%
b Dependent Variable: EAS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.094	.010		9.593	.000		
	RTF%	.051	.026	.093	1.969	.050	.843	1.187
	ROS%	-.093	.018	-.243	-5.147	.000	.843	1.187

a Dependent Variable: EAS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 4 Regression – % Expenditures on Academic Support – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.213(a)	.045	.045	.039813057924228

a Predictors: (Constant), RTF%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.117	1	.117	73.791	.000(a)
	Residual	2.468	1557	.002		
	Total	2.585	1558			

a Predictors: (Constant), RTF%
b Dependent Variable: EAS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.050	.003		19.155	.000		
	RTF%	.093	.011	.213	8.590	.000	1.000	1.000

a Dependent Variable: EAS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 4 Regression – % Expenditures on Student Services

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.149(a)	.022	.022	.037615785703173

a Predictors: (Constant), ROS%

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.065	1	.065	46.248	.000(a)
	Residual	2.896	2047	.001		
	Total	2.962	2048			

a Predictors: (Constant), ROS%
b Dependent Variable: ESS%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.102	.002		47.081	.000		
	ROS%	-.042	.006	-.149	-6.801	.000	1.000	1.000

a Dependent Variable: ESS%

Question 4 Regression – % Expenditures on Student Services – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.209(a)	.044	.042	.036236238281243

a Predictors: (Constant), ROS%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.029	1	.029	22.270	.000(a)
	Residual	.641	488	.001		
	Total	.670	489			

a Predictors: (Constant), ROS%
b Dependent Variable: ESS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.111	.005		23.181	.000		
	ROS%	-.067	.014	-.209	-4.719	.000	1.000	1.000

a Dependent Variable: ESS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 4 Regression – % Expenditures on Student Services – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.133(a)	.018	.017	.038019335311290

a Predictors: (Constant), ROS%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.041	1	.041	28.240	.000(a)
	Residual	2.251	1557	.001		
	Total	2.291	1558			

a Predictors: (Constant), ROS%
b Dependent Variable: ESS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.100	.002		40.929	.000		
	ROS%	-.037	.007	-.133	-5.314	.000	1.000	1.000

a Dependent Variable: ESS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 4 Regression – % Expenditures on Institutional Support

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.157(a)	.025	.024	.050731563759998

a Predictors: (Constant), ROS%, RTF%

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.133	2	.067	25.899	.000(a)
	Residual	5.266	2046	.003		
	Total	5.399	2048			

a Predictors: (Constant), ROS%, RTF%
b Dependent Variable: EIS%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.134	.005		29.020	.000		
	RTF%	-.055	.013	-.096	-4.273	.000	.935	1.069
	ROS%	.039	.009	.102	4.514	.000	.935	1.069

a Dependent Variable: EIS%

Question 4 Regression – % Expenditures on Institutional Support – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.266(a)	.071	.069	.049714100941149

a Predictors: (Constant), RTF%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.092	1	.092	37.237	.000(a)
	Residual	1.206	488	.002		
	Total	1.298	489			

a Predictors: (Constant), RTF%
b Dependent Variable: EIS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.175	.007		26.175	.000		
	RTF%	-.172	.028	-.266	-6.102	.000	1.000	1.000

a Dependent Variable: EIS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 4 Regression – % Expenditures on Institutional Support – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.161(a)	.026	.025	.050640988005480

a Predictors: (Constant), ROS%, RTF%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.106	2	.053	20.737	.000(a)
	Residual	3.990	1556	.003		
	Total	4.097	1558			

a Predictors: (Constant), ROS%, RTF%
b Dependent Variable: EIS%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.123	.005		24.542	.000		
	RTF%	-.029	.014	-.053	-2.073	.038	.951	1.052
	ROS%	.052	.009	.141	5.484	.000	.951	1.052

a Dependent Variable: EIS%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 4 Regression – % Expenditures on Other Expenses

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.425(a)	.180	.180	.074845644127023

a Predictors: (Constant), ROS%

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.521	1	2.521	450.021	.000(a)
	Residual	11.467	2047	.006		
	Total	13.988	2048			

a Predictors: (Constant), ROS%
b Dependent Variable: EOE%

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.224	.004		51.853	.000		
	ROS%	.263	.012	.425	21.214	.000	1.000	1.000

a Dependent Variable: EOE%

Question 4 Regression – % Expenditures on Other Expenses – Arts & Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.433(a)	.187	.184	.063412009007553

a Predictors: (Constant), ROS%, RTF%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.451	2	.226	56.089	.000(a)
	Residual	1.958	487	.004		
	Total	2.409	489			

a Predictors: (Constant), ROS%, RTF%
b Dependent Variable: EOE%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.299	.015		20.261	.000		
	RTF%	-.176	.039	-.200	-4.492	.000	.843	1.187
	ROS%	.190	.027	.313	7.024	.000	.843	1.187

a Dependent Variable: EOE%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 4 Regression – % Expenditures on Other Expenses – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.436(a)	.190	.189	.077375134635417

a Predictors: (Constant), ROS%

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.186	1	2.186	365.194	.000(a)
	Residual	9.322	1557	.006		
	Total	11.508	1558			

a Predictors: (Constant), ROS%
b Dependent Variable: EOE%
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.218	.005		43.654	.000		
	ROS%	.270	.014	.436	19.110	.000	1.000	1.000

a Dependent Variable: EOE%
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 5 Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.154(a)	.024	.016	10.725

a Predictors: (Constant), ROS%, RTF%

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	695.088	2	347.544	3.021	.051(a)
	Residual	28526.968	248	115.028		
	Total	29222.056	250			

a Predictors: (Constant), ROS%, RTF%
b Dependent Variable: RETR

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	64.641	2.524		25.610	.000		
	RTF%	-14.484	6.601	-.147	-2.194	.029	.879	1.138
	ROS%	-7.860	4.362	-.121	-1.802	.073	.879	1.138

a Dependent Variable: RETR

Question 6 Regression – Instruction per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.754(a)	.568	.567	1391.94039808629900

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5222540129.778	3	1740846709.926	898.502	.000(a)
	Residual	3973808545.312	2051	1937498.072		
	Total	9196348675.090	2054			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: EINS

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-370.583	113.290		-3.271	.001		
	RTFS	.503	.032	.227	15.618	.000	1.000	1.000
	RSLS	.548	.012	.687	47.098	.000	.991	1.009
	ROSS	.201	.010	.283	19.387	.000	.991	1.009

a Dependent Variable: EINS

Question 6 Regression – Instruction per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.638(a)	.407	.403	1377.65167929839100

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	644743854.128	3	214914618.043	113.237	.000(a)
	Residual	939472453.989	495	1897924.149		
	Total	1584216308.118	498			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: EINS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	53.079	271.713		.195	.845		
	RTFS	.697	.079	.310	8.856	.000	.981	1.020
	RSLS	.260	.037	.251	7.077	.000	.953	1.049
	ROSS	.274	.016	.594	16.623	.000	.939	1.065

a Dependent Variable: EINS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 6 Regression – Instruction per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.791(a)	.625	.625	1330.74209896985600

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4589649974.991	3	1529883324.997	863.914	.000(a)
	Residual	2748397276.723	1552	1770874.534		
	Total	7338047251.714	1555			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: EINS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-98.399	123.549		-.796	.426		
	RTFS	.468	.034	.214	13.761	.000	.999	1.001
	RSLS	.574	.012	.757	48.603	.000	.995	1.005
	ROSS	.136	.013	.164	10.514	.000	.994	1.006

a Dependent Variable: EINS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 6 Regression – Academic Support per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.339(a)	.115	.114	503.416589809741000

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	67550496.663	3	22516832.221	88.849	.000(a)
	Residual	519781367.199	2051	253428.263		
	Total	587331863.862	2054			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: EASS

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	152.119	40.973		3.713	.000		
	RTFS	.136	.012	.243	11.707	.000	1.000	1.000
	RSLS	.040	.004	.197	9.421	.000	.991	1.009
	ROSS	.027	.004	.151	7.238	.000	.991	1.009

a Dependent Variable: EASS

Question 6 Regression – Academic Support per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.509(a)	..259	.254	480.639899473539000

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39881919.563	3	13293973.188	57.546	.000(a)
	Residual	114352282.918	495	231014.713		
	Total	154234202.481	498			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: EASS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-376.352	94.796		-3.970	.000		
	RTFS	.170	.027	.242	6.180	.000	.981	1.020
	RSLS	.142	.013	.437	11.036	.000	.953	1.049
	ROSS	.034	.006	.237	5.947	.000	.939	1.065

a Dependent Variable: EASS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 6 Regression – Academic Support per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.326(a)	.106	.104	499.434114187241000

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	45974806.184	3	15324935.395	61.439	.000(a)
	Residual	387122242.211	1552	249434.434		
	Total	433097048.394	1555			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: EASS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	192.851	46.369		4.159	.000		
	RTFS	.131	.013	.247	10.299	.000	.999	1.001
	RSLS	.030	.004	.161	6.710	.000	.995	1.005
	ROSS	.029	.005	.146	6.062	.000	.994	1.006

a Dependent Variable: EASS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 6 Regression – Student Services per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.519(a)	.270	.269	512.340283900829000

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	198811597.335	3	66270532.445	252.466	.000(a)
	Residual	538372253.907	2051	262492.567		
	Total	737183851.242	2054			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: ESSS

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	86.573	41.699		2.076	.038		
	RTFS	.089	.012	.141	7.481	.000	1.000	1.000
	RSLS	.109	.004	.484	25.550	.000	.991	1.009
	ROSS	.035	.004	.174	9.186	.000	.991	1.009

a Dependent Variable: ESSS

Question 6 Regression – Student Services per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.509(a)	.259	.255	462.655999256012000

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37057785.004	3	12352595.001	57.709	.000(a)
	Residual	105955033.956	495	214050.574		
	Total	143012818.960	498			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: ESSS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-151.636	91.249		-1.662	.097		
	RTFS	.122	.026	.181	4.629	.000	.981	1.020
	RSLS	.147	.012	.470	11.870	.000	.953	1.049
	ROSS	.032	.006	.229	5.741	.000	.939	1.065

a Dependent Variable: ESSS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 6 Regression – Student Services per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.522(a)	.273	.271	525.724042681911000

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	160934989.877	3	53644996.626	194.095	.000(a)
	Residual	428950713.572	1552	276385.769		
	Total	589885703.449	1555			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: ESSS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	111.965	48.809		2.294	.022		
	RTFS	.080	.013	.129	5.937	.000	.999	1.001
	RSLS	.105	.005	.489	22.540	.000	.995	1.005
	ROSS	.040	.005	.172	7.902	.000	.994	1.006

a Dependent Variable: ESSS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 6 Regression – Institutional Support per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.505(a)	.256	.255	592.491287337366000

a Predictors: (Constant), ROSS, RSLS

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	246874199.788	2	123437099.894	351.627	.000(a)
	Residual	719293101.494	2049	351045.926		
	Total	966167301.282	2051			

a Predictors: (Constant), ROSS, RSLS
b Dependent Variable: EISS

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	626.010	35.662		17.554	.000		
	RSLS	.090	.005	.349	18.240	.000	.995	1.005
	ROSS	.102	.005	.393	20.540	.000	.995	1.005

a Dependent Variable: EISS

Question 6 Regression – Institutional Support per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.588(a)	.346	.343	553.670218628728000

a Predictors: (Constant), ROSS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	80226583.486	2	40113291.743	130.854	.000(a)
	Residual	151742601.943	495	306550.711		
	Total	231969185.429	497			

a Predictors: (Constant), ROSS, RSLS
b Dependent Variable: EISS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	223.245	83.940		2.660	.008		
	RSLS	.173	.015	.433	11.713	.000	.969	1.032
	ROSS	.107	.008	.482	13.057	.000	.969	1.032

a Dependent Variable: EISS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 6 Regression – Institutional Support per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.489(a)	.239	.238	599.159031671926000

a Predictors: (Constant), ROSS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	174667446.483	2	87333723.241	243.275	.000(a)
	Residual	556795886.658	1551	358991.545		
	Total	731463333.141	1553			

a Predictors: (Constant), ROSS, RSLS
b Dependent Variable: EISS
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	669.851	41.232		16.246	.000		
	RSLS	.081	.005	.339	15.277	.000	.996	1.004
	ROSS	.104	.006	.373	16.788	.000	.996	1.004

a Dependent Variable: EISS
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 6 Regression – Other Expenses per Student

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.516(a)	.266	.265	1354.691119813193000

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1364398632.637	3	454799544.212	247.822	.000(a)
	Residual	3763970649.737	2051	1835188.030		
	Total	5128369282.374	2054			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: EOES

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1256.346	110.258		11.395	.000		
	RTFS	.211	.031	.127	6.733	.000	1.000	1.000
	RSLS	.142	.011	.238	12.518	.000	.991	1.009
	ROSS	.246	.010	.463	24.380	.000	.991	1.009

a Dependent Variable: EOES

Question 6 Regression – Other Expenses per Student – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.633(a)	.400	.398	1058.641723335025000

a Predictors: (Constant), ROSS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	370186522.874	2	185093261.437	165.155	.000(a)
	Residual	554757537.701	495	1120722.298		
	Total	924944060.575	497			

a Predictors: (Constant), ROSS, RSLS
b Dependent Variable: EOES
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1323.991	160.497		8.249	.000		
	RSLS	.211	.028	.264	7.458	.000	.969	1.032
	ROSS	.276	.016	.624	17.633	.000	.969	1.032

a Dependent Variable: EOES
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 6 Regression – Other Expenses per Student – Applied Sciences-Oriented Institutions

Model Summary

Model	R 1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)	Adjusted R Square		Std. Error of the Estimate
1	.532(a)	.283	.282	1390.620914575444000

a Predictors: (Constant), ROSS, RTFS, RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1186512804.075	3	395504268.025	204.519	.000(a)
	Residual	3001298771.541	1552	1933826.528		
	Total	4187811575.615	1555			

a Predictors: (Constant), ROSS, RTFS, RSLS
b Dependent Variable: EOES
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1066.996	129.108		8.264	.000		
	RTFS	.228	.036	.138	6.421	.000	.999	1.001
	RSLS	.134	.012	.234	10.861	.000	.995	1.005
	ROSS	.296	.014	.471	21.874	.000	.994	1.006

a Dependent Variable: EOES
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 7 Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.191(a)	.036	.032	10.224

a Predictors: (Constant), RSLS

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	962.896	1	962.896	9.212	.003(a)
	Residual	25503.429	244	104.522		
	Total	26466.325	245			

a Predictors: (Constant), RSLS
b Dependent Variable: RETR

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	55.128	1.308		42.155	.000		
	RSLS	.001	.000	.191	3.035	.003	1.000	1.000

a Dependent Variable: RETR

Question 7 Regression – Arts & Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 1 (Selected)			
1	.335(a)	.112	.097	8.013

a Predictors: (Constant), RSLS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	470.120	1	470.120	7.321	.009(a)
	Residual	3724.280	58	64.212		
	Total	4194.400	59			

a Predictors: (Constant), RSLS
b Dependent Variable: RETR
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	51.354	2.530		20.301	.000		
	RSLS	.001	.000	.335	2.706	.009	1.000	1.000

a Dependent Variable: RETR
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 1

Question 7 Regression – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.172(a)	.030	.024	10.820

a Predictors: (Constant), ROSS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	656.575	1	656.575	5.608	.019(a)
	Residual	21540.823	184	117.070		
	Total	22197.398	185			

a Predictors: (Constant), ROSS
b Dependent Variable: RETR
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	61.503	1.362		45.163	.000		
	ROSS	-.001	.000	-.172	-2.368	.019	1.000	1.000

a Dependent Variable: RETR
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Question 8 Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.169(a)	.029	.012	10.239

a Predictors: (Constant), EOE%, EIS%, ESS%, EAS%

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	742.782	4	185.696	1.771	.135(a)
	Residual	25265.303	241	104.835		
	Total	26008.085	245			

a Predictors: (Constant), EOE%, EIS%, ESS%, EAS%
b Dependent Variable: RETR

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	69.363	3.994		17.367	.000		
	EAS%	-25.888	17.764	-.100	-1.457	.146	.853	1.173
	ESS%	-15.337	16.473	-.063	-.931	.353	.884	1.131
	EIS%	-16.000	11.584	-.090	-1.381	.168	.948	1.055
	EOE%	-15.692	6.924	-.157	-2.266	.024	.845	1.183

a Dependent Variable: RETR

Question 9 Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.303(a)	.092	.088	9.890

a Predictors: (Constant), EINS

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2395.462	1	2395.462	24.491	.000(a)
	Residual	23767.330	243	97.808		
	Total	26162.792	244			

a Predictors: (Constant), EINS
b Dependent Variable: RETR

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	52.162	1.475		35.357	.000		
	EINS	.001	.000	.303	4.949	.000	1.000	1.000

a Dependent Variable: RETR

Question 9 Regression – Applied Sciences-Oriented Institutions

Model Summary

Model	R	Adjusted R Square		Std. Error of the Estimate
	1=A&S-Oriented, 2=AS-Oriented = 2 (Selected)			
1	.321(a)	.103	.098	10.333

a Predictors: (Constant), EINS

ANOVA(b,c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2252.960	1	2252.960	21.101	.000(a)
	Residual	19646.099	184	106.772		
	Total	21899.059	185			

a Predictors: (Constant), EINS
b Dependent Variable: RETR
c Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

Coefficients(a,b)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	51.996	1.723		30.184	.000		
	EINS	.002	.000	.321	4.594	.000	1.000	1.000

a Dependent Variable: RETR
b Selecting only cases for which 1=A&S-Oriented, 2=AS-Oriented = 2

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